

June 13, 2001

TO: ALL OFFERORS

SUBJECT: Request for Proposal (RFP) No. DTRS57-01-R-20021, Entitled "Retrofit Installation of Extinguishing Systems and Water Washdown Systems Onboard LCU 2000" with Seven Options for Seven Additional LCU-2000 Watercrafts

The Volpe National Transportation Systems Center intends to conduct a pre-proposal conference for the subject requirement on June 21, 2001 at 0900 onboard the LCU-2014 in Mare Island, CA. **Attendance at the pre-proposal conference is mandatory.**

Directions to Mare Island, CA: From Oakland Airport – Take 180 to Vallejo. Take Mare Island Exit (Tennessee St. Exit). North on Tennessee to the Army Base. The Government will meet with the Offerors in Building 1481.

Each Offeror will be allowed two (2) representatives. Each Offeror shall submit names of attendees and any questions concerning the solicitation to the Contracting Officer, Kathleen Regan. A written reply **is mandatory** stating the name of your company, name of representative(s), telephone number, telefax number and e-mail address which must be faxed to the Contracting Officer, Kathleen Regan at (617-494-3024) or e-mailed to regan@volpe.dot.gov no later than **1:00 P.M. EST, June 19, 2001.**

An overview of the subject requirements will be given, followed by a site visit onboard the LCU-2014. Cameras and video cameras will only be allowed on site while viewing internal watercraft spaces and only at the discretion of the ship Commanding Officer.

To save time and space, the drawings contained in Attachment 2 are in a compressed format (zipped files). The user must decompress (unzip) the files to read and print them, using a utility such as WinZip. Visit www.winzip.com for more information about the Winzip utility.

If there are any questions, please contact the undersigned at 617-494-3485.

Sincerely,

Kathleen Regan
Contracting Officer

SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS <i>OFFEROR TO COMPLETE BLOCKS 12,17, 23, 24 & 30</i>				1. REQUISITION NUMBER 35- 3184		PAGE OF 1 41	
2. CONTRACT NO.		3. AWARD/EFFECTIVE DATE		4. ORDER NUMBER		5. SOLICITATION NUMBER DTRS57- 01- R- 20021	
						6. SOLICITATION ISSUE DATE 06/13/2001	
7. FOR SOLICITATION INFORMATION CALL :		a. NAME Kathleen Regan		b. TELEPHONE NUMBER <i>(No collect calls)</i> (617) 494- 3485		8. OFFER DUE DATE/LOCAL TIME 07/10/2001 1500 ET	
9. ISSUED BY U. S. DOT/RSPA/Volpe Center 55 Broadway Kendall Square Cambridge, MA 02142				CODE DTS- 853		10. THIS ACQUISITION IS <input type="checkbox"/> UNRESTRICTED <input checked="" type="checkbox"/> SET ASIDE 100.00 % FOR <input checked="" type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> SMALL DISADV. BUSINESS <input type="checkbox"/> 8(A) SIC: 336611 SIZE STANDARD:	
				11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED <input type="checkbox"/> SEE SCHEDULE		12. DISCOUNT TERMS	
				<input type="checkbox"/> 13A. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)			
				13b. RATING			
				14. METHOD OF SOLICITATION <input type="checkbox"/> RFQ <input type="checkbox"/> IFB <input checked="" type="checkbox"/> RFP			
15. DELIVER TO VOLPE CENTER				CODE VNTSC		16. ADMINISTERED BY U. S. DOT/RSPA/Volpe Center 55 Broadway Kendall Square Cambridge, MA 02142	
17A. CONTRACTOR/ OFFEROR		CODE		FACILITY CODE		18a. PAYMENT WILL BE MADE BY	
						CODE	
TELEPHONE NO.				18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED. <input type="checkbox"/> SEE ADDENDUM			
<input type="checkbox"/> 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER							
19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES				21. QUANTITY	22. UNIT	23. UNIT PRICE
0001	(Base) Retrofit FM-200 and Water Washdown systems Continued ...				1.00 EA		
25. ACCOUNTING AND APPROPRIATION DATA						26. TOTAL AWARD AMOUNT <i>(For Govt. Use Only)</i>	
<input checked="" type="checkbox"/> 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA <input checked="" type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED.							
<input type="checkbox"/> 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4, FAR 52.212-5 IS ATTACHED. ADDENDA <input type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED.							
28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN.					29. AWARD OF CONTRACT: REFERENCE _____ OFFER DATED _____. YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:		
30a. SIGNATURE OF OFFEROR/CONTRACTOR					31a. UNITED STATES OF AMERICA <i>(SIGNATURE OF CONTRACTING OFFICER)</i>		
30b. NAME AND TITLE OF SIGNER <i>(Type or Print)</i>					30c. DATE SIGNED		31b. NAME OF CONTRACTING OFFICER <i>(Type or Print)</i>
							31c. DATE SIGNED
32a. QUANTITY IN COLUMN 21 HAS BEEN <input type="checkbox"/> RECEIVED <input type="checkbox"/> INSPECTED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED					33. SHIP NUMBER <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		34. VOUCHER NUMBER
					36. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		35. AMOUNT VERIFIED CORRECT FOR
32b. SIGNATURE OF AUTHORIZED GOVT. REPRESENTATIVE					32c. DATE		37. CHECK NUMBER
41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT					42a. RECEIVED BY <i>(Print)</i>		40. PAID BY
41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER					41c. DATE		42b. RECEIVED AT <i>(Location)</i>
							42c. DATE REC'D <i>(YY/MM/DD)</i>
							42d. TOTAL CONTAINERS

CONTINUATION SHEET	REF.NO. OF DOC. BEING CONT'D. DTRS57- 01- R- 20021	PAGE 2	OF 41
---------------------------	--	------------------	-----------------

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	onboard LCU-2014 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachment 1-4. Period of performance - See Section IV, Table 1. Period of performance for the entire contract if all options are exercised is Fifty (50) months.				
0001AA	Initial on-board training to be conducted on-board the LCU-2014 within 30 calendar days of installation completion. In lieu of training in week 6 of the work. NOTE: This price is for delayed training only. Period of Performance: 08/05/2001 to 09/04/2001	1.00	EA		
0002	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2022 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1.				
0002AA	If exercised during contract year 1	1.00	EA		
0002AB	If exercised during contract year 2	1.00	EA		
0002AC	If exercised during contract year 3	1.00	EA		
0002AD	If exercised during contract year 4	1.00	EA		
0003	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2025 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1.				
0003AA	If exercised during contract year 1	1.00	EA		
0003AB	If exercised during contract year 2	1.00	EA		
0003AC	If exercised during contract year 3	1.00	EA		
0003AD	If exercised during contract year 4	1.00	EA		
0004	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2026 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1. Continued ...				

CONTINUATION SHEET	REF.NO. OF DOC. BEING CONT'D. DTRS57- 01- R- 20021	PAGE 3	OF 41
---------------------------	--	------------------	-----------------

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
0004AA	If exercised during contract year 1	1.00	EA		
0004AB	If exercised during contract year 2	1.00	EA		
0004AC	If exercised during contract year 3	1.00	EA		
0004AD	If exercised during contract year 4	1.00	EA		
0005	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2028 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1.				
0005AA	If exercised during contract year 1	1.00	EA		
0005AB	If exercised during contract year 2	1.00	EA		
0005AC	If exercised during contract year 3	1.00	EA		
0005AD	If exercised during contract year 4	1.00	EA		
0006	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2030 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1.				
0006AA	If exercised during contract year 1	1.00	EA		
0006AB	If exercised during contract year 2	1.00	EA		
0006AC	If exercised during contract year 3	1.00	EA		
0006AD	If exercised during contract year 4	1.00	EA		
0007	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2032 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1.				
0007AA	If exercised during contract year 1	1.00	EA		
0007AB	If exercised during contract year 2	1.00	EA		
	Continued ...				

CONTINUATION SHEET	REF.NO. OF DOC. BEING CONT'D. DTRS57- 01- R- 20021	PAGE 4	OF 41
---------------------------	--	------------------	-----------------

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
0007AC	If exercised during contract year 3	1.00	EA		
0007AD	If exercised during contract year 4	1.00	EA		
0008	Option - Retrofit FM-200 and Water Washdown systems onboard LCU-2033 Watercraft, located at Mare Island, CA in accordance with Section IV and Attachments 1-4. Period of Performance - See Section IV, Table 1.				
0008AA	If exercised during contract year 1	1.00	EA		
0008AB	If exercised during contract year 2	1.00	EA		
0008AC	If exercised during contract year 3	1.00	EA		
0008AD	If exercised during contract year 4	1.00	EA		
0009	Option - Initial on-board training to be conducted on-board the LCU-2022 within 30 calendar days of installation completion (RE: CLIN 0002). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0009AA	If exercised during contract year 1	1.00	EA		
0009AB	If exercised during contract year 2	1.00	EA		
0009AC	If exercised during contract year 3	1.00	EA		
0009AD	If exercised during contract year 4	1.00	EA		
0010	Option - Initial on-board training to be conducted on-board the LCU-2025 within 30 calendar days of installation completion (RE: CLIN 0003). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0010AA	If exercised during contract year 1	1.00	EA		
0010AB	If exercised during contract year 2	1.00	EA		
0010AC	If exercised during contract year 3	1.00	EA		
0010AD	If exercised during contract year 4	1.00	EA		
	Continued ...				

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
0011	Option - Initial on-board training to be conducted on-board the LCU-2026 within 30 calendar days of installation completion (RE: CLIN 0004). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0011AA	If exercised during contract year 1	1.00	EA		
0011AB	If exercised during contract year 2	1.00	EA		
0011AC	If exercised during contract year 3	1.00	EA		
0011AD	If exercised during contract year 4	1.00	EA		
0012	Option - Initial on-board training to be conducted on-board the LCU-2028 within 30 calendar days of installation completion (RE: CLIN 0005). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0012AA	If exercised during contract year 1	1.00	EA		
0012AB	If exercised during contract year 2	1.00	EA		
0012AC	If exercised during contract year 3	1.00	EA		
0012AD	If exercised during contract year 4	1.00	EA		
0013	Option - Initial on-board training to be conducted on-board the LCU-2030 within 30 calendar days of installation completion (RE: CLIN 0006). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0013AA	If exercised during contract year 1	1.00	EA		
0013AB	If exercised during contract year 2	1.00	EA		
0013AC	If exercised during contract year 3	1.00	EA		
0013AD	If exercised during contract year 4	1.00	EA		
0014	Option - Initial on-board training to be Continued ...				

CONTINUATION SHEET	REF.NO. OF DOC. BEING CONT'D. DTRS57- 01- R- 20021	PAGE 6	OF 41
---------------------------	--	------------------	-----------------

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	conducted on-board the LCU- 2032 within 30 calendar days of installation completion (RE: CLIN 0007). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0014AA	If exercised during contract year 1	1.00	EA		
0014AB	If exercised during contract year 2	1.00	EA		
0014AC	If exercised during contract year 3	1.00	EA		
0014AD	If exercised during contract year 4	1.00	EA		
0015	Option - Initial on-board training to be conducted on-board the LCU- 2033 within 30 calendar days of installation completion (RE: CLIN 008). In lieu of training week 6 of the work. NOTE: This price is for delayed training only.				
0015AA	If exercised during contract year 1	1.00	EA		
0015AB	If exercised during contract year 2	1.00	EA		
0015AC	If exercised during contract year 3	1.00	EA		
0015AD	If exercised during contract year 4	1.00	EA		

(Note: There is no Section II)

SECTION III - CONTRACT CLAUSES

3.1 52.252-2 Clauses Incorporated by Reference. (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arneet.gov/far/>
<http://www.dot.gov/ost/M60/tamtar>
<http://farsite.hill.af.mil/vffar.htm>

3.2 Addenda to 52.212-4 Contract Terms and Conditions - Commercial Items (MAY 2001). Incorporate the following FAR Clauses by reference:

52.217-7 OPTIONS INCREASED QUANTITY - SEPARATELY PRICED LINE ITEM (MAR 1989)
Fill in:

CLIN 0002AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0002AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0002AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0002AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0003AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0003AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0003AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0003AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0004AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0004AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0004AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0004AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0005AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0005AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0005AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0005AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0012AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0012AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0012AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0012AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0013AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0013AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0013AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0013AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0014AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0014AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0014AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0014AD within 48 months after award
NOTE: Notification period is within 48 months after award

CLIN 0015AA within 12 months after award
NOTE: Notification period is within 12 months after award
CLIN 0015AB within 24 months after award
NOTE: Notification period is within 24 months after award
CLIN 0015AC within 36 months after award
NOTE: Notification period is within 36 months after award
CLIN 0015AD within 48 months after award
NOTE: Notification period is within 48 months after award

52.232-29 TERMS FOR FINANCING OF PURCHASES OF COMERCIALS ITEMS (OCT 1995)
52.245-2 GOVERNMENT PROPERTY (FIXED PRICE CONTRACTS(DEC 1989))

3.3 Addenda to 52.212-4 Contract Terms and conditions - Commercial Items (May 2001), paragraph (a) Inspection/Acceptance, add the following:

Work acceptance by the Government will be based on compliance with this SOW, the installation specification, detailed design drawings and successfully passing the Functional Test Plan. This shall include Manufacturer Certification "tag" of the systems, turn in of halon 1301 cylinders/agent to Richmond, VA and conduct of "hands on" training and delivery of all CDRL's.

For Contractor Data Requirements List see Section 2.9.

For Information Purpose - Upon system acceptance, within 2 to 4 weeks, the Volpe Center will issue the Technical Manuals, as-built drawings, and a revised fire control plan to the crew.

(As stated in Section 2.5)

3.4 Addenda to 52.212-4 Contract Terms and conditions - Commercial Items (May 2001), paragraph (o) Warranty, add the following subparagraph:

Warranty/Annual Re-certifications - The Contractor shall provide one (1) year warranties on all equipment and installation performed from the time of Volpe Center acceptance of the systems onboard the watercraft. Each installation shall include three (3) years of annual manufacturer inspections, re-certification and routine preventative maintenance services by a MCTR at the vessel's homeport. (As stated in Section IV, 2.6)

3.5 52.212-5 Contract Terms and Conditions Required to Implement Statutes or Executive Orders -- Commercial Items (May2001)

(a) The Contractor shall comply with the following FAR clauses, which are incorporated in this contract by reference, to implement provisions of law or executive orders applicable to acquisitions of commercial items:

- (1) 52.222-3, Convict Labor (E.O. 11755);
- (2) 52.233-3, Protest after Award (31 U.S.C 3553).

(b) The Contractor shall comply with the FAR clauses in this paragraph (b) that the contracting officer has indicated as being incorporated in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items or components:

[Contracting Officer shall check as appropriate.]

 X (1) 52.203-6, Restrictions on Subcontractor Sales to the Government, with Alternate I (41 U.S.C. 253g and 10 U.S.C. 2402).

 (2) 52.219-3, Notice of HUBZone Small Business Set-Aside (Jan 1999).

 X (3) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999) (if the offeror elects to waive the preference, it shall so indicate in its offer).

 (4) (i) 52.219-5, Very Small Business Set-Aside (Pub. L. 103-403, section 304, Small Business Reauthorization and Amendments Act of 1994).

 (ii) Alternate I to 52.219-5.

 (iii) Alternate II to 52.219-5.

 (5) 52.219-8, Utilization of Small Business Concerns (15 U.S.C. 637 (d)(2) and (3)).

 (6) 52.219-9, Small Business Subcontracting Plan (15 U.S.C. 637 (d)(4)).

 X (7) 52.219-14, Limitations on Subcontracting (15 U.S.C. 637(a)(14)).

 (8) (i) 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323) (if the offeror elects to waive the adjustment, it shall so indicate in its offer).

 (ii) Alternate I of 52.219-23.

___ (9) 52.219-25, Small Disadvantaged Business Participation Program-Disadvantaged Status and Reporting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).

___ (10) 52.219-26, Small Disadvantaged Business Participation Program-Incentive Subcontracting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).

X (11) 52.222-21, Prohibition of Segregated Facilities (Feb 1999).

X (12) 52.222-26, Equal Opportunity (E.O. 11246).

X (13) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212).

X (14) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C. 793).

X (15) 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212).

___ (16) 52.222-19, Child Labor-Cooperation with Authorities and Remedies (E.O. 13126).

___ (17)(i) 52.223-9, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (42 U.S.C. 6962(c)(3)(A)(ii)).

___ (ii) Alternate I of 52.223-9 (42 U.S.C. 6962(i)(2)(C)).

X (18) 52.225-1, Buy American Act-Balance of Payments Program-Supplies (41 U.S.C. 10a-10d).

___ (19)(i) 52.225-3, Buy American Act - North American Free Trade Agreement - Israeli Trade Act - Balance of Payments Program (41 U.S.C. 10a-10d, 19 U.S.C. 3301 note, 19 U.S.C. 2112 note).

___ (ii) Alternate I of 52.225-3.

___ (iii) Alternate II of 52.225-3.

___ (20) 52.225-5, Trade Agreements (19 U.S.C. 2501, *et seq.*, 19 U.S.C. 3301 note).

___ (21) 52.225-13, Restriction on Certain Foreign Purchases (E.O. 12722, 12724, 13059, 13067, 13121, and 13129).

___ (22) 52.225-15, Sanctioned European Union Country End Products (E.O. 12849).

___ (23) 52.225-16, Sanctioned European Union Country Services (E.O. 12849).

X (24) 52.232-33, Payment by Electronic Funds Transfer-Central Contractor Registration (31 U.S.C. 3332).

___ (25) 52.232-34, Payment by Electronic Funds Transfer-Other Than Central Contractor Registration (31 U.S.C. 3332).

___ (26) 52.232-36, Payment by Third Party (31 U.S.C. 3332).

___ (27) 52.239-1, Privacy or Security Safeguards (5 U.S.C. 552a).

X (28) (i) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (46 U.S.C. 1241).

___ (ii) Alternate I of 52.247-64.

(c) The Contractor shall comply with the FAR clauses in this paragraph (c), applicable to commercial services, which the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

[Contracting Officer check as appropriate.]

___ (1) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, *et seq.*).

[Subcontracts for certain commercial services may be exempt from coverage if they meet the criteria in FAR 22.1103-4(c) or (d) (see DoD class deviation number 2000-00006)]

___ (2) 52.222-42, Statement of Equivalent Rates for Federal Hires (29 U.S.C. 206 and 41 U.S.C. 351, *et seq.*).

___ (3) 52.222-43, Fair Labor Standards Act and Service Contract Act -- Price Adjustment (Multiple Year and Option Contracts) (29 U.S.C. 206 and 41 U.S.C. 351, *et seq.*).

___ (4) 52.222-44, Fair Labor Standards Act and Service Contract Act -- Price Adjustment (29 U.S.C. 206 and 41 U.S.C. 351, *et seq.*).

___ (5) 52.222-47, SCA Minimum Wages and Fringe Benefits Applicable to Successor Contract Pursuant to Predecessor Contractor Collective Bargaining Agreement (CBA) (41 U.S.C. 351, *et seq.*).

___ (6) 52.222-50, Nondisplacement of Qualified Workers (Executive Order 12933).

(d) *Comptroller General Examination of Record.* The Contractor shall comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records -- Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this

contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) or (d) of this clause, the Contractor is not required to include any FAR clause, other than those listed below (and as may be required by an addenda to this paragraph to establish the reasonableness of prices under Part 15), in a subcontract for commercial items or commercial components --

(1) 52.222-26, Equal Opportunity (E.O. 11246);

(2) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C. 4212);

(3) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C. 793);

(4) 52.247-64, Preference for Privately-Owned U.S. Flag Commercial Vessels (46 U.S.C. 1241) (flow down not required for subcontracts awarded beginning May 1, 1996); and

(5) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C. 351, *et seq.*).

SECTION IV - DOCUMENTS, EXHIBITS, ATTACHMENTS

TABLE OF CONTENTS

Section

- 1.0 Background
- 2.0 Statement of Work
 - 2.1 General Requirements
 - 2.2 Scope of Work
 - 2.3 Manufacturer Certified Technical Representative
 - 2.4 Initial Onboard Training
 - 2.5 Final Acceptance/Deliverables
 - 2.6 Warranty/Annual re-certifications
 - 2.7 Government Furnished Equipment
 - 2.8 Government Furnished Information
 - 2.9 Contract Data Requirements List
- 3.0 Other Contractor Work Activity
- 4.0 Production Meetings and Schedules
- 5.0 Optional Contract Line Item Numbers

List of Tables:

- Table 1, Overall Contract Schedule of Deliverables
- Table 2, Spaces Protected and Misc. Modifications Summary
- Table 3, Contractor supplied Special Tools and Spare Parts

List of Attachments (provided electronically):

- Attachment 1, Installation Specification
- Attachment 2, Detailed Design Drawings:
 - LCU-2000-5553-1, FM-200™ System Piping Installation and Details, (28 sheets).
 - LCU-2000-5553-2, FM-200™ System Miscellaneous Mods, (6 sheets).
 - LCU-2000-5553-3, FM-200™ System Electrical Modifications, (12 sheets).
 - LCU-2000-5553-4, FM-200™ System label plates and Placards, (12 sheets).
 - LCU-2000-5231-1, WWS Piping Installation and Details, (12 sheets).
 - LCU-2000-5231-2, WWS Label Plates and Placards, (12 sheets).
- Attachment 3, Health and Safety Plan (HASP) with Appendices A through O
- Attachment 4, Functional Test Plan
- Attachment 5, Past Performance Form (VNTSC F 4200.7)
- Attachment 6, Client Authorization Letter

1.0 BACKGROUND

The Volpe National Transportation Systems Center (Volpe Center) has been providing the U.S. Army Tank-automotive and Armaments Command (TACOM), Watercraft Systems Management Office with project management and technical expertise in the retrofit of Kidde FM-200™ (Heptafluoropropane, HFC-227ea) fire extinguishing system replacements for U.S. Army watercraft Halon total flooding systems. The Montreal Protocol has compelled the removal of Halon 1301 ozone depleting chemicals from use as a fire extinguishing agent onboard U.S. Army watercraft.

After a first article (prototype) design, test and evaluation phase, the Volpe Center and Army have successfully retrofit commercial Kidde FM-200™ engineered fire extinguishing systems as a suitable replacement. A 9% design concentration was applied to the protected spaces and validated through cold agent discharge tests. In addition, research and performance testing of the water washdown systems, in conjunction with the FM-200™ systems, was conducted prior to implementation onboard the vessels. FM-200™ matches the fire extinguishing performance of the currently installed Halon systems, with consideration to retrofit constraints onboard the watercraft. First Article installations have been completed onboard the LSV, LCU-2000, LCU-1600, 128' Large Tug and LCM-8, mod. 2 watercraft classes. Water washdown systems have been installed in all below deck spaces for the purpose of mitigating hydrogen fluoride gas and aid in quickly reducing compartment temperatures in the event of a fire. Installation specifications and detailed design class drawings were developed to support this production installation phase.

For the production phase, the Volpe Center is continuing to support the Army by providing project management and technical expertise with engineering analysis, design approvals, quality assurance inspections, functional test validation, installation oversight, and training of the Kidde FM-200™ engineered clean agent systems. The Volpe Center is also acting on behalf of the U.S. Coast Guard for inspection and installation approvals on each individual watercraft. In this role, the Volpe Center will be performing the as-fitted inspection and acceptance of the installed systems for the U.S. Coast Guard's Office of Marine Safety and Environmental Protection.

This Statement of Work (SOW) describes the work efforts to be performed by the Contractor in performing the installation of the Kidde Engineered, FM-200™ Fixed Fire Extinguishing Systems to the LCU-2014 Army Watercraft, site location at Mare Island, California. In addition, there are seven (7) optional Contract Line Item Numbers (CLIN's 0002 through 0007) for application of this SOW to seven (7) additional LCU-2000's at Mare Island, CA.

2.0 STATEMENT OF WORK

Complete Retrofit Installation of Fixed Fire Extinguishing and Water Washdown Systems Onboard the LCU-2014 Watercraft, located at Mare Island, CA.

2.1 General Requirements - The Installation Contractor shall demonstrate as required recent past or current compliance with a valid Master Ship Repair Agreement, Master "Lump Sum" Repair Agreement, or Agreement for Boat Repairs (48 CFR 217.71), and provide installation oversight by a Certified Manufacturer's Technical Representative for installing FM-200™ total flooding, marine listed, fire extinguishing systems. The contractor shall provide all the necessary labor and materials to remove the existing Halon fire extinguishing systems, remove and re-install any interferences, and install new commercially available Kidde FM-200™ and Water Washdown systems based on the attached installation specifications and detailed design drawings. The removed Halon 1301 agent and storage cylinders shall remain the property of the Army.

The substitution of any alternative commercial manufacturer components other than those identified on the design drawings is acceptable, except only Kidde brand name components and FM 200 agent shall be used for the FM-200 fire extinguishing systems. Contractor shall demonstrate equivalency and shall submit appropriate manufacturer data sheets.

Table 1 is a summary of the overall contract schedule of deliverables.

Table 2 is a summary of the spaces to be protected, system removals and installations, and miscellaneous modifications. Table 3 is a list of special tools and spare parts to be supplied by the contractor.

Attachment 1 is the Installation Specification and Attachment 2 is the detailed design drawings for FM-200™ and Water Washdown System Installations, including Miscellaneous and Electrical Modifications, and Label Plates and Placards.

Attachment 3 is the Health and Safety Plan, and Attachment 4 is the Functional Test Plan, to be followed and completed by the contractor.

Attachments 1, 2, 3 and 4 are hereby incorporated by reference into the SOW.

At a minimum, the FM-200™ and Water Washdown Systems (WWS) installations shall include the following components, equipment, servicing, and data deliverables:

- Detailed production schedule, including daily labor loadings.
- Removal of existing Halon 1301 systems in the main engine room, bow thruster space, emergency generator space, and the paint locker. Turn in of Halon agent and cylinders to the Defense Depot, Richmond, VA.
- Removal and reinstallation of any interferences to complete the work (i.e.- cables, pipes, ductwork, cabinets, storage shelves, etc.).
- Installation of FM-200™ systems and WWS using all new marine listed equipment and materials, based on detailed design class drawings (i.e. - valves, piping, agent and cylinders, pull stations, alarms, miscellaneous mod's., electrical, etc.). New individual systems shall be installed in the main engine room (includes storeroom and machine shop); pipe tunnel; bow thruster space; emergency generator space and paint locker. Note - the emergency generator space and paint locker do not receive a WWS system.
- Manufacturer Certified Technical Representative installation oversight, and

certification of the FM-200™ systems.

- Spare parts, as identified on Table 3.
- Engineering design changes (miscellaneous mod's.) specified in the installation specification and reflected on the drawings.
- Portable hydrogen fluoride gas detector pump, including protective pouch, 10' sampling line and adapter, and supply of twelve detector tubes.
- Completed functional testing. The Volpe Center will provide the Functional Test Plan.
- Initial onboard training, to include classroom and hands-on. The Volpe Center will provide the classroom training video. The Certified Tech. Rep. will participate in the classroom training and conduct the system walkthroughs.
- Update (POC's, local site information, etc.) and adherence to the Volpe Center Health and Safety Plan (HASP).
- Three (3) years of annual manufacturer inspections, routine maintenance and re-certifications.
- One (1) year warranty on parts and installation, upon system acceptance by the Volpe Center.
- Megger readings of all automatic shutdown wiring reused between pressure switches and equipment shutdowns.

For Information Purpose - Approximately 2 to 4 weeks after completion of the work, the Volpe Center will provide the technical manuals, training materials (video) and FM-200 as-built drawings for the vessel.

2.2 Scope of Work - The Contractor shall install system hardware and equipment per **Attachment 1, Installation Specification, and Attachment 2, Detailed Design Drawings**. Installed systems shall include complete new FM-200™ fire extinguishing components and water washdown system components (based on detailed design drawings), including equipment and materials for the miscellaneous modifications to the watercraft. The installation shall be conducted dockside at the watercraft's homeport facility of Mare Island, CA. **The Government will provide forty (40) days notification prior to the scheduled installation date for the purpose of shipchecking and order of materials. Completion of onboard retrofit work shall be accomplished on or before a (6) six consecutive calendar week duration; this schedule includes allowing 3 days for COTR inspections, functional testing, and certification, plus one day for training during week 6. Training will be required to be performed on Saturday for reserve vessels. The installation start date shall be on or about October 1, 2001. The vessel will be available for contractor workers between the approximate hour/days of 0700 and 1800, six (6) days per week.**

Note - Installations shall follow the detailed design drawings to the greatest extent feasible. Any deviations in piping routes beyond the noted guidelines on the drawings (also, see guidelines on page 6) must be approved by the Government prior to installation and shall be identified during the pre-installation shipcheck.

Within ten (10 days) of notification to proceed from the Contracting Officer, the Contractor shall conduct a shipcheck of the individual scheduled vessel at its homeport. The shipcheck objectives are to plan the work installation, evaluate the class drawing dimensions for fit (red line, as necessary), arrange for any support services, and to determine any unforeseen problems which may affect the installations (i.e., minor and major interference problems, FM-200 piping configuration changes, etc.). Minor modifications are the responsibility of the Contractor. Major modifications are outside this

original scope of work, and are those items which require re-engineering of the FM-200 systems (including cylinders or agent), or the procurement of materials greater than 20% above those listed on the drawing bills of materials, as a result of performing the shipcheck.

FM-200 Recalculation Requirements - FM-200 Flow Calculations shall be rerun by the Contractor (using UL approved Kidde flow program) and submitted to the Volpe Center prior to installing, if the system piping or mass of agent is changed (deviations), as a result of the shipcheck. Any deviations in routing of piping (the addition or subtraction of more than 10% in volume of any pipe run defined as: cylinder to a tee, tee to a tee, and tee to a nozzle) or the addition or subtraction of fittings, or reorientation of Tee's, shall constitute a deviation (design change). A change of mass of agent would be required if an adjustment to the volume of the protected space above the bilge plates varies by more than +/- 5 percent due to gross volume change or the addition or subtraction of major equipment (net volume). Any design changes (during shipcheck) must be proposed to the Volpe Center Contracting Officer's Technical Representative (COTR) in writing, and will be reviewed and approved by the government prior to installation. The registered P.E. will be furnished by the government. The Government (Volpe Center) will be responsible to evaluate the gross and net volume changes in relation to the LCU-2034 prototype (class) design. This volume information will be provided during the shipcheck. Note - Volpe Center is responsible for developing the as-built documentation, and any unauthorized field deviations to FM-200 systems are the contractors full responsibility and the contractor shall be required to provide updated calculations (proving system continues to meet flow design parameters), prior to final acceptance by the government.

The Contractor shall visually inspect and evaluate the enclosure integrity of each space to be protected and provide written inspection reports to the COTR regarding the relative air tightness of the spaces. Any openings which, in the opinion of the contractor, will result in the gaseous agents inability to maintain the 15 minute required hold time shall be brought to the attention of the COTR for correction. The Contractor shall repair minor openings (i.e., abandoned cable or pipe penetrations, etc.) as part of this work effort. For major repairs, cost estimates and repair schedules shall be provided to the COTR for consideration. The Contractor shall provide a written shipcheck condition report, including enclosure integrity inspection results and red lined drawings within seven (7) days of the shipcheck to the Volpe Center, and identify any problems found and proposed solutions, as necessary.

Installations shall meet all of the requirements of the installation specifications, detailed design drawings, to include system functional testing, manufacturer certification, and provide initial onboard training and CDRL deliverables, prior to acceptance by the COTR.

The Contractor shall provide all labor, tools, support services and installation consumables required to successfully install the system hardware and materials, according to this SOW, attached installation specification and detailed design drawings. The Contractor shall be responsible to arrange and supply any temporary services required for the conduct of this work, for example, crane services, shore power, bilge cleaning, gas free certificates, fire watches during hot work, toilet facilities, etc. as necessary. It is the Contractors full responsibility to ensure the bilges are sufficiently cleaned and pumped dry, to obtain and maintain the hot work permits, which shall be issued by a certified "marine chemist", and maintained by a certified "competent person". It is the government's responsibility to ensure no equipment is run or the vessel is moved under its own power, which could jeopardize the certificates, once issued.

The Army will provide short-term storage availability for up to a 40' ISO container (up to 7 weeks) for storage of system hardware and equipment in relatively close proximity to the subject vessel, depending on pier access and safe working load constraints.

Compressed gas cylinders shall be prepared for shipment and shipped in accordance with 49 CFR, Chapter I - Department of Transportation, Subchapter C, Subparts 171 through 177, compressed gas cylinders. CO₂, Halon, and FM-200™ agent and cylinder shipping and handling, and FM-200™ cylinder testing and inspecting shall be accomplished in accordance with the Compressed Gas Association guidelines, pamphlets P-1, C-1 and C-6. ***The Halon agent/storage cylinders shall remain the property of the United States Army***, however, all other elements of the Halon system being removed, including waste oils, CO₂, etc., shall be properly disposed of by the Contractor according to Local, State, and Federal Regulations. Halon cylinders (including Halon agent) shall be removed from the watercraft, individually tagged, properly crated (when appropriate) and marked for shipment (49 CFR, Subchapter C), and delivered to the Defense Depot - Richmond, VA (DDRV)/DoD Halon banking facility by the Contractor. The Government will provide DD Form 1348, DoD Single Line Item Requisition Document, and detailed documentation procedures prior to shipments. The Contractor must provide verification of receipt of all shipments to the Volpe Center COTR, prior to final payment.

Deliver to: Defense Depot - Richmond, VA (DDRV)/DOD Halon banking facility
SW0400, Cylinder Operations
8000 Jefferson Davis Highway
Richmond, VA 23297-5900
Attn: Steve Minus
(804-279-5203)

Turned in cylinders must be tagged/labeled as follows:

1. The shippers DoD Activity Address Code(DoDAAC).
2. The shipping activity with POC and phone number.
3. The NSN and serial numbers of the cylinders.
4. Type of ODS.
5. The quantity of (lbs. of Halon) agent.
6. Packaged and labeled in compliance with DOT regulations.

2.3 Manufacturer Certified Technical Representative - The Contractor shall provide a Manufacturer Certified Technical Representative qualified to certify FM-200™ fire extinguishing systems, to attend each installation, for the purpose of performing installation oversight, inspection, functional testing, system certifications, and validation of Manufacturer warranty of each installed system. The Contractor shall also have access to a Manufacturer Certified Designer for FM-200 flow calculations for the purpose of evaluating any proposed FM-200 piping design changes (during the installation process), prior to requesting government approval.

2.4 Initial Onboard Training - The Contractor shall participate in a half day of initial onboard training for the crew. A classroom instruction, training video and question/answer period will be conducted by the Volpe Center, and assisted by the Manufacturer Certified Technical Representative (MCTR). The MCTR shall also participate in questions/answers. In addition, group (less than 12 crewmembers at one time) walkthroughs shall be provided by the MCTR to demonstrate space preparation, system operation and failure modes, routine preventative maintenance and inspection to all crewmembers. The initial training shall be based on the Volpe Center furnished training plan, which includes:

1. Training Plan
2. Video:
 - General Overview of FM-200™.
 - System hazards and fire fighting properties.
 - Space preparation and operation of the WWS and FM-200™ fire extinguishing systems (including failure modes) for each of the protected spaces.
 - Re-entry procedures, including HF test procedures.
 - Inspection and maintenance.
 - Spare parts.
3. Question/answer period.
4. System Walkthroughs.

2.5 Final Acceptance/Deliverables - Work acceptance by the Government will be based on compliance with this SOW, the installation specification, detailed design drawings and successfully passing the Functional Test Plan, including Manufacturer Certification "tag" of the systems, turn in of halon 1301 cylinders/agent to Richmond, and conduct of "hands on" training and delivery of all CDRL's. See also FAR Clause 52.212-4(a)

For Contractor Data Requirements List see Section 2.9.

For information purpose - Upon system acceptance, within 2 to 4 weeks, the Volpe Center will issue the Technical Manuals, as-built drawings, and a revised fire control plan to the crew.

2.6 Warranty/Annual Re-certifications - The Contractor shall provide one (1) year warranty on all equipment and installation performed from the time of Volpe Center acceptance of the systems onboard the watercraft. Each installation shall include three (3) years of annual manufacturer inspections, re-certification and routine preventative maintenance services by a MCTR at the vessels homeport, Mare Island, CA. See also FAR Clause 52.212-4(o).

2.7 Government Furnished Equipment - None

2.8 Government Furnished Information - The following electronic copies are included as part of the solicitation:

1. Installation Specifications as Attachment 1.
2. Detailed Design Drawings as Attachment 2.
3. Health and Safety Plan as Attachment 3
4. Functional Test Plan as Attachment 4.
5. Volume measurements (after award, at end of Shipcheck, paper copy only).

3.0 Other Contractor Work Activity - During the performance of these work efforts, including the optional CLINS, another contractor may be conducting work onboard the vessel. Under management by the U.S. Navy, a contractor may be installing some equipment in the below main deck spaces. As a result of these efforts, some coordination and cooperation of work activities may be necessary. Other contractor activity work items may include: oily water separator, marine sanitary device and evaporator installations in the engine room, storage tank enlargement in the tunnel, and ventilation upgrade (ductwork) for engine room stores room/tunnel/bow thruster. The contractor shall meet with the Volpe Center COTR, Navy COTR and their contractor during the Shipcheck process to discuss scope of work and schedules to coordinate this effort in advance of work start onboard. A reasonable coordination of work effort may require up to 2 weeks of avoiding a specific work area within

the space (i.e. - the aft portion of the port side of engine room exclusive of the stairway). The conducting of some shift work may be necessary to avoid interfering with each contractors work effort in a specific area. Bilge cleaning and gas freeing shall be completed by the Volpe Contractor within the first 3 days of installation start date.

4.0 Production Meetings and Schedules - The contractor's site supervisor and quality control representative shall participate in a daily briefing held onboard the subject vessel with the COTR, or designated assistant, the Skipper or Chief Engineer. The contractor shall participate in a weekly production meeting on Wednesdays to discuss progress, review the production schedule, quality control, safety, planned work and any issues which may effect the work progress over the next week. During weekly production meetings, the contractor shall provide written progress reports, addressing systems status and spaces worked in.

TABLE 1 - CONTRACT SCHEDULE

Task	Period of Performance
Notice to Proceed	NLT 40 days prior to installation start date
Pre-installation Shipcheck	NLT 30 days prior to installation start date
Shipcheck inspection report, and copy of red-lined drawings.	NLT 7 days after shipcheck
Any minor proposed Production Schedule changes must be approved by the CO/COTR).	NLT 7 days after shipcheck
Page updates to HASP(page 2, 28, A2, A3,A4, I1, K2, M2)	NLT 7 days after shipcheck
Final Detailed Production Plan	NLT 21 days prior to installation start date
Individual Installation	Not to exceed 6 consecutive calendar weeks
Daily briefings	Daily at 0800 onboard vessel (M-F).
Production Meetings	Weekly (Wednesdays) onboard vessel.
Inspection, Functional Test and Acceptance by COTR	Week 6 (up to 3 days, Monday-Friday)
Contractor Data Deliverables	At completion of installation
Functional test report.	at completion of installation
Megger readings of automatic shutdown wires.	at completion of installation
FM-200/CO ₂ cylinders independent Certifications	at completion of installation
Any necessary revised FM-200 calculations	prior to government approval
Initial Onboard Crew Training	Half day, during week 6, upon system acceptance by COTR (and mutually agreed between COTR and crew).
Signed Halon turn-in Recipients (DDRV)	NLT 14 days after completion of installation Prior to release of payment
<u>Annual</u> Re-certifications	3 annual re-certifications, based upon finalrk acceptance date, at vessels homeport

(NLT= No later than days= calendar days)

TABLE 2
SPACES PROTECTED AND MISC. MODIFICATIONS SUMMARY

Protected Space	Halon System Removal	FM-200™ Installation	WWS Installation	FM-200™ Storage Cylinder Locations	Miscellaneous Modifications
Engine Room	Yes	Yes	Yes	Emerg. Gen. Room and Tunnel (split)	Door seals
Pipe Tunnel	No	Yes	Yes	Engine Room	Hinged vent covers (fwd. and aft), vent closure hand wheel
Bow Thruster Space	No	Yes	Yes	Tunnel	None
Emerg. Gen. Room	No	Yes	No	Storage Closet (01 deck)	Automatic door latch, Maintenance to (3) vent covers, fire resistive duct tape seals (spec. p 23). 3 new automatic fire dampers (spec. p 44).
Paint Locker	Yes	Yes	No	Bow Thruster Space	New vent covers (intake and exhaust, qty. 2)

TABLE 3
SPECIAL TOOLS AND SPARE PARTS

Special Tools					
Part No.	Quantity	CAGE Code	Description		
487500	1 Each	7L021	HF Detector Tube Pump, Remote Sampling Adapter, and Carrying Pouch		
804142	1 Box	7L021	Detector Tubes, Hydrogen Fluoride Gas (HF-1), 1-25 ppm Range, 3 ppm Threshold Limit Value (TLV), 10 Per Box		
73067	1 Each	7L021	Sampling Line, 10 Feet Long		
Spare Parts			Found On		
Part Number.	Qty.	CAGE Code	Description.	Drawing Number.	Find No.
31302	2 Each	1DA54	Replacement Glass (Watertight Pull Box), Part Number 870087	LCU-2000-5553-1	82

TABLE 3 (Continued)

928103	2 Each	1DA54	Replacement Glass (Pull Box), Part Number 871403	LCU-2000-5553-1	92
15262	12 Each	1DA54	Seal Wires	LCU-2000-5553-1	Various
SPC1	2 Each	7N423	Nozzle guards	LCU-2000-5231-	61
TF10	2 Each	99134	Nozzles		7

5.0 Optional Contract Line Item Numbers (CLIN's) - The Contractor shall provide all the labor and materials to complete up to seven (7) additional LCU-2000 watercraft, using the above SOW. Exercise of Options may be over a four (4) year period from award of the Base Task. Award of an Option by the Government will be with a minimum of forty days notification prior to installation start date onboard the subject vessel, and no vessels will be required to be worked simultaneously.

6.0 Place of Delivery/Performance

The place of shall be:

CLINs 0001 through 0015 - Mare Island, CA

SECTION V - SOLICITATION PROVISIONS

5.1 52.252-1 Solicitation Provisions Incorporated by Reference. (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

<http://www.dot.gov/ost/M60/tamtar>
<http://www.warsite.hill.af.mil/vffar.htm>
<http://www.arnet.gov/far>

5.2 CONTRACT AWARD UNDER TEST PROGRAM

Contract Award Under Test Program - This procurement is being conducted in accordance with Federal Acquisition Regulation Subpart 13.5 - Test Program for Certain Commercial Items. The contracting officer is utilizing policies and procedures prescribed in Part 12, Acquisition of Commercial items, Part 13.5 Test Program for Certain Commercial Items and Part 15, Contracting by Negotiation.

5.3 ADDENDA 52.212-1 Instructions to Offerors--Commercial Items (OCT 2000)

5.3.1 Pre-proposal conference. A Pre-proposal conference will be held on **June 21, 2001 at 0900 hours and end approximately at 1300 hours on board LCU-2014, Mare Island, CA.** Attendance at the pre-proposal conference is mandatory. Each Offeror will be allowed two (2) representatives. Each Offeror shall submit names of attendees any questions concerning the solicitation to the Contracting Officer, Kathleen Regan. A written reply **is mandatory** stating the name of your company, name of representative(s), telephone number, telefax number and e-mail address must be faxed to the Contracting Officer, Kathleen Regan at (617-494-3024) or e-mailed to **regan@volpe.dot.gov** no later than 1:00 P.M. EST, June 19, 2001.

5.3.2 Paragraph (b) Submission Of Offers. An original and two copies of each offer shall be delivered to Ms. Kathleen Regan, Contracting Officer, DTS-853, to the address specified in Block 9 on the first page of Standard Form 1449, no later than 3:00 PM Eastern Standard Time on the offeror due date specified in Block 8. The outermost envelope(s) or package(s) shall be clearly marked with the solicitation number specified in Block 5.

5.3.4. Paragraph (b) Submission Of Offers. Add the following FAR provisions:
52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)
52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

5.3.5. Paragraph (b) Submission Of Offers, Subparagraph (1) Past performance information: Each Offeror shall submit with its offer, three past performance reports on contracts that it is currently performing or has completed within the past three years. The Offeror must make a good faith effort to insure that its past performance reports include prime contracts with a value over \$100,000 with

the federal Government. Past performance information will be used for responsibility determinations and as an evaluation factor. References other than those provided by the Offeror may be contacted by the Government and information received will be used in the evaluation of the Offeror's past performance.

For this solicitation, the Government will consider an Offeror's past performance that is most relevant to the requirements of Section IV in demonstrating an Offeror's ability to deliver the required items within the required delivery time schedule. Each past performance report shall include the following information: name and mailing address of the customer; contract number; contract type; total contract value; description of the contract work; contracting officer's full name, title, mailing address, voice telephone number, facsimile telephone number, and e-mail address.

The Offeror is responsible for making all reasonable efforts to ensure that a completed past performance report for each of the three contracts is received by the Government no later than the due date for receipt of offers. If a contracting activity has completed a contractor past performance report and has provided a copy to the Offeror, a copy of the report is sufficient. If the contracting activity has not developed its own past performance report form, VNTSC Form 4200.7, included as Attachment 5, shall be provided. Information contained in the past performance reports will be considered sensitive, and will not be disclosed to other Offerors.

If the Government receives negative past performance information (indicating that performance was less than satisfactory) which is not accompanied by a response from the Offeror, a copy of the adverse information will be provided to the Offeror. The Offeror will then be given a limited period of time in which to provide a response. If no response is received within the specified time, the negative past performance information will be evaluated as submitted.

Offerors must send a Client Authorization Letter, included as Attachment 2 to this section, to all non-federal Government customers to assist in the timely processing of past performance evaluations. The Offeror must mail Client Authorization Letters to individual references no later than the offer due date. Each offer shall include copies of completed Client Authorization Letters.

If the Offeror has no relevant past performance history, it shall so state. Offerors shall include past performance reports, or state that no past performance history exists or could be obtained, clearly documenting reasonable efforts taken. An Offeror whose proposal does not include or address past performance information will be ineligible for award.

5.3.6. Paragraph (b) Submission Of Offers, in lieu of Subparagraph (4) and (5), add the following: In order for the Government to make a determination of technical acceptability, each offer shall include the documentation specified below. Failure of an Offeror to submit the required documentation with its offer shall render its offer nonresponsive, and therefore, ineligible for award.

To Be Submitted With Offer

1. Detailed Production Schedule, including daily labor loads and crafts.
2. Management plans to maintain schedule.
3. Companies Quality Control Management Procedures/Plan (for all aspects of work).
4. Welders Certificates (USCG/ABS/MilStd.) for types of materials specified on drawings.
5. Manufacturer Certified Technical Representative Certificate and identification (individual's name and organization) of Manufacturer Certified Designer
6. Marine Chemist and "Competent Person" certificates. (Note: Competent person as defined by Occupational Safety and Health Administration requirements in 29 CFR 1915)
7. Past Performance - Three similar marine installations for fixed, total flooding gaseous systems, including Client points of contact.
8. Master Ship Repair Agreement, Lump Sum, or Agreement for Boat Repairs letter.
9. Terms of any express warranty.
10. If the Offeror includes products equal to a specified brand name, submit documentation proving equality in accordance with FAR 52.211-6 Brand Name or Equal (Aug 1999)

Note - Competent person as defined by OSHA requirements in 29CFR 1915.

5.3.7. Paragraph (c) Period for acceptance of offers. The Offeror agrees to hold the prices in its offer firm for 60 calendar days (changed from the standard 30 days) from the date specified for receipt of offers, unless another time period is specified in an addendum to the solicitation.

5.3.8 52.212-2 Evaluation - Commercial Items. (JAN 1999)

(a) The Government will award a contract resulting from this solicitation to the responsible Offeror whose offer conforming to the solicitation will be most advantageous to the Government, price and other factors considered. The following factors shall be used to evaluate offers:

Award of the contract resulting from this solicitation will be made to the responsible Offeror whose offer is technically acceptable, and offers the best value to the Government in terms of price and past performance. Price and past performance are equal in value and will be the deciding factor among technically acceptable offers. Technical acceptability will be determined on a Pass/Fail basis given the Offeror's ability to comply with the technical requirements and delivery requirements in Section IV. If an offeror lacks relevant past performance, it will not be evaluated favorably or unfavorably on past performance.

(b) A written notice of award or acceptance of an offer, mailed or otherwise furnished to the successful Offeror within the time for acceptance specified in the offer, shall result in a binding contract without further action by either party. Before the offer's specified expiration time, the Government may accept an offer (or part of an offer), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award.

5.3.9 52.217-5 Evaluation of Options. (Jul 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award

purposes as follows. For option CLINs 0002 through CLINs 0015, the Government will calculate the average amount for the 4 fiscal years. The resulting total average price for each option will be added to the total price for the basic requirement, CLIN 0001, to determine the total evaluated price for the offer. Evaluation of options will not obligate the Government to exercise the option(s).

5.3.10 52.211-6 Brand Name or Equal (Aug 1999)

(a) If an item in this solicitation is identified as "brand name or equal," the purchase description reflects the characteristics and level of quality that will satisfy the Government's needs. The salient physical, functional, or performance characteristics that "equal" products must meet are specified in the solicitation.

(b) To be considered for award, offers of "equal" products, including "equal" products of the brand name manufacturer, must--

(1) Meet the salient physical, functional, or performance characteristic specified in this solicitation;

(2) Clearly identify the item by--

(i) Brand name, if any; and

(ii) Make or model number;

(3) Include descriptive literature such as illustrations, drawings, or a clear reference to previously furnished descriptive data or information available to the Contracting Officer; and

(4) Clearly describe any modifications the offeror plans to make in a product to make it conform to the solicitation requirements. Mark any descriptive material to clearly show the modifications.

(c) The Contracting Officer will evaluate "equal" products on the basis of information furnished by the offeror or identified in the offer and reasonably available to the Contracting Officer. The Contracting Officer is not responsible for locating or obtaining any information not identified in the offer.

(d) Unless the offeror clearly indicates in its offer that the product being offered is an "equal" product, the offeror shall provide the brand name product referenced in the solicitation.

5.3.11 52.232-31 Invitation to Propose Financing Terms. (OCT 1995)

(a) The offeror is invited to propose terms under which the Government shall make contract financing payments during contract performance. The financing terms proposed by the offeror shall be a factor in the evaluation of the offeror's proposal. The financing terms of the successful offeror and the clause, Terms for Financing of Purchases of Commercial Items, at 52.232-29, shall be incorporated in any resulting contract.

(b) The offeror agrees that in the event of any conflict between the terms proposed by the offeror and the terms in the clause at 52.232-29, Terms for Financing of Purchases of Commercial Items, the terms of the clause at 52.232-29 shall govern.

(c) Because of statutory limitations (10 U.S.C. 2307(f) and 41 U.S.C. 255(f)), the offeror's proposed financing shall not be acceptable if it does not conform to the following limitations:

(1) Delivery payments shall be made only for supplies delivered and accepted, or services rendered and accepted in accordance with the payment terms of this contract;

(2) Contract financing payments shall not exceed 15 percent of the contract price in advance of any performance of work under the contract;

(3) The terms and conditions of the contract financing must be appropriate or customary in the commercial marketplace; and

(4) The terms and conditions of the contract financing must be in the best interests of the United States.

(d) The offeror's proposal of financing terms shall include the following:

(1) The proposed contractual language describing the contract financing (see FAR 32.202-2 for appropriate definitions of types of payments); and

(2) A listing of the earliest date and greatest amount at which each contract financing payment may be payable and the amount of each delivery payment. Any resulting contract shall provide that no contract financing payment shall be made at any earlier date or in a greater amount than shown in the offeror's listing.

(e) The offeror's proposed prices and financing terms shall be evaluated to determine the cost to the United States of the proposal using the interest rate and delivery schedule specified elsewhere in this solicitation.

5.3.12 Evaluation of Financing Terms

For those offers which propose financing terms in accordance with FAR 52.232-31, the proposed prices for all CLIN Numbers referenced below with the financing terms applied (per 52.232-31(d)(2)(e)), will be used to determine the total evaluated price for the offer. For purpose of calculating imputed interest of 5.9% the following dates will be assumed.

CLIN Number	Date of Order	Payment of Firm fixed price
0001	July 23, 2001	September 29, 2001
0002AA	July 23, 2001	September 29, 2001
0002AB	July 23, 2002	September 29, 2002
0002AC	July 23, 2003	September 29, 2003
0002AD	July 23, 2004	September 29, 2004
0003AA	July 23, 2001	September 29, 2001
0003AB	July 23, 2002	September 29, 2002
0003AC	July 23, 2003	September 29, 2003
0003AD	July 23, 2004	September 29, 2004
0004AA	July 23, 2001	September 29, 2001
0004AB	July 23, 2002	September 29, 2002
0004AC	July 23, 2003	September 29, 2003
0004AD	July 23, 2004	September 29, 2004

CLIN Number	Date of Order	Payment of Firm fixed price
0005AA	July 23, 2001	September 29, 2001
0005AB	July 23, 2002	September 29, 2002
0005AC	July 23, 2003	September 29, 2003
0005AD	July 23, 2004	September 29, 2004
0006AA	July 23, 2001	September 29, 2001
0006AB	July 23, 2002	September 29, 2002
0006AC	July 23, 2003	September 29, 2003
0006AD	July 23, 2004	September 29, 2004
0007AA	July 23, 2001	September 29, 2001
0007AB	July 23, 2002	September 29, 2002
0007AC	July 23, 2003	September 29, 2003
0007AD	July 23, 2004	September 29, 2004
0008AA	July 23, 2001	September 29, 2001
0008AB	July 23, 2002	September 29, 2002
0008AC	July 23, 2003	September 29, 2003
0008AD	July 23, 2004	September 29, 2004
0009AA	July 23, 2001	September 29, 2001
0009AB	July 23, 2002	September 29, 2002
0009AC	July 23, 2003	September 29, 2003
0009AD	July 23, 2004	September 29, 2004
0010AA	July 23, 2001	September 29, 2001
0010AB	July 23, 2002	September 29, 2002
0010AC	July 23, 2003	September 29, 2003
0010AD	July 23, 2004	September 29, 2004
0011AA	July 23, 2001	September 29, 2001
0011AB	July 23, 2002	September 29, 2002
0011AC	July 23, 2003	September 29, 2003
0011AD	July 23, 2004	September 29, 2004
0012AA	July 23, 2001	September 29, 2001
0012AB	July 23, 2002	September 29, 2002
0012AC	July 23, 2003	September 29, 2003
0012AD	July 23, 2004	September 29, 2004
0013AA	July 23, 2001	September 29, 2001
0013AB	July 23, 2002	September 29, 2002
0013AC	July 23, 2003	September 29, 2003
0013AD	July 23, 2004	September 29, 2004
0014AA	July 23, 2001	September 29, 2001
0014AB	July 23, 2002	September 29, 2002
0014AC	July 23, 2003	September 29, 2003
0014AD	July 23, 2004	September 29, 2004
0015AA	July 23, 2001	September 29, 2001
0015AB	July 23, 2002	September 29, 2002
0015AC	July 23, 2003	September 29, 2003
0015AD	July 23, 2004	September 29, 2004

**5.4 52.212-3 Offeror Representations and Certifications - Commercial Items.
(MAY 2001)**

(a) *Definitions.* As used in this provision:

"Emerging small business" means a small business concern whose size is no greater than 50 percent of the numerical size standard for the NAICS code designated.

"Forced or indentured child labor" means all work or service-

(1) Exacted from any person under the age of 18 under the menace of any penalty for its nonperformance and for which the worker does not offer himself voluntarily; or

(2) Performed by any person under the age of 18 pursuant to a contract the enforcement of which can be accomplished by process of penalties.

"Service-disabled veteran-owned small business concern"-

(1) Means a small business concern-

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern" means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and size standards in this solicitation.

"Veteran-owned small business concern" means a small business concern-

(1) Not less than 51 percent of which is owned by one or more veterans(as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern" means a small business concern --

(1) That is at least 51 percent owned by one or more women or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

"Women-owned business concern" means a concern which is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) *Taxpayer identification number (TIN)* (26 U.S.C. 6109, 31 U.S.C. 7701). (Not applicable if the offeror is required to provide this information to a central contractor registration database to be eligible for award.)

(1) All offerors must submit the information required in paragraphs (b)(3) through (b)(5) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the Internal Revenue Service (IRS).

(2) The TIN may be used by the government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.]

(3) *Taxpayer Identification Number (TIN)*.

* TIN:_____.

* TIN has been applied for.

* TIN is not required because:

* Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

* Offeror is an agency or instrumentality of a foreign government;

* Offeror is an agency or instrumentality of the Federal Government;

(4) *Type of organization*.

* Sole proprietorship;

* Partnership;

* Corporate entity (not tax-exempt);

* Corporate entity (tax-exempt);

* Government entity (Federal, State, or local);

* Foreign government;

* International organization per 26 CFR 1.6049-4;

* Other _____.

(5) *Common parent.*

*** Offeror is not owned or controlled by a common parent:**

*** Name and TIN of common parent:**

Name _____

TIN _____

(c) Offerors must complete the following representations when the resulting contract is to be performed inside the United States, its territories or possessions, Puerto Rico, the Trust Territory of the Pacific Islands, or the District of Columbia. Check all that apply.

(1) *Small business concern.* The offeror represents as part of its offer that it * is, * is not a small business concern.

(2) *Veteran-owned small business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents as part of its offer that it * is, * is not a veteran-owned small business concern.

(3) *Service-disabled veteran-owned small business concern.* [Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (c)(2) of this provision.] The offeror represents as part of its offer that it * is, * is not a service-disabled veteran-owned small business concern.

(4) *Small disadvantaged business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents, for general statistical purposes, that it * is, * is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(5) *Women-owned small business concern.* [Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.] The offeror represents that it * is, * is not a women-owned small business concern.

Note: Complete paragraphs (c)(6) and (c)(7) only if this solicitation is expected to exceed the simplified acquisition threshold.

(6) *Women-owned business concern (other than small business concern).* [Complete only if the offeror is a women-owned business concern and did not represent itself as a small business concern in paragraph (c)(1) of this provision.]. The offeror represents that it * is, a women-owned business concern.

(7) *Tie bid priority for labor surplus area concerns.* If this is an invitation for bid, small business offerors may identify the labor surplus areas in which costs to be incurred on account of manufacturing or production (by offeror or first-tier subcontractors) amount to more than 50 percent of the contract price:

(8) Small Business Size for the Small Business Competitiveness Demonstration Program and for the Targeted Industry Categories under the Small Business Competitiveness Demonstration Program. *[Complete only if the offeror has represented itself to be a small business concern under the size standards for this solicitation.]*

(i) (Complete only for solicitations indicated in an addendum as being set-aside for emerging small businesses in one of the four designated industry groups (DIGs).) The offeror represents as part of its offer that it * is, * is not an emerging small business.

(ii) (Complete only for solicitations indicated in an addendum as being for one of the targeted industry categories (TICs) or four designated industry groups (DIGs).) Offeror represents as follows:

(A) Offeror's number of employees for the past 12 months (check the Employees column if size standard stated in the solicitation is expressed in terms of number of employees); or

(B) Offeror's average annual gross revenue for the last 3 fiscal years (check the Average Annual Gross Number of Revenues column if size standard stated in the solicitation is expressed in terms of annual receipts).

(Check one of the following):

<u>Number of Employees</u>	<u>Average Annual Gross Revenues</u>
50 or fewer	\$1 million or less
51-100	\$1,000,001-\$2 million
101-250	\$2,000,001-\$3.5 million
251-500	\$3,500,001-\$5 million
501-750	\$5,000,001-\$10 million
751-1,000	\$10,000,001-\$17 million
Over 1,000	Over \$17 million

(9)

(i) *General.* The offeror represents that either-

(A) It * is, * is not certified by the Small Business Administration as a small disadvantaged business concern and identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration (PRO-Net), and that no material change in disadvantaged ownership and control has occurred since its certification, and, where the concern is owned by one or more individuals claiming disadvantaged status, the net worth of each individual upon whom the certification is based does not

exceed \$750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); or

(B) It *has, * has not submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(ii) Joint Ventures under the Price Evaluation Adjustment for Small Disadvantaged Business Concerns. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements in 13 CFR 124.1002(f) and that the representation in paragraph (c)(7)(i) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture: _____.]

(d) Representations required to implement provisions of Executive Order 11246
--

(1) *Previous contracts and compliance.* The offeror represents that --

(i) It * has, * has not, participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation; and

(ii) It * has, * has not, filed all required compliance reports.

(2) *Affirmative Action Compliance.* The offeror represents that --

(i) It * has developed and has on file, * has not developed and does not have on file, at each establishment, affirmative action programs required by rules and regulations of the Secretary of Labor (41 CFR parts 60-1 and 60-2), or

(ii) It * has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(e) Certification Regarding Payments to Influence Federal Transactions (31 U.S.C. 1352). (Applies only if the contract is expected to exceed \$100,000.) By submission of its offer, the offeror certifies to the best of its knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with the award of any resultant contract.

(f) *Buy American Act - Balance of Payments Program Certificate.* (Applies only if the clause at Federal Acquisition Regulation (FAR) 52.225-1, Buy American Act - Balance of Payments Program--Supplies, is included in this solicitation.)

(1) The offeror certifies that each end product, except those listed in paragraph (f)(2) of this provision, is a domestic end product (as defined in the clause of this solicitation entitled "Buy American Act - Balance of Payments Program--Supplies") and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States. The offeror shall list as foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

(2) Foreign End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(3) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(g)

(1) *Buy American Act -- North American Free Trade Agreement -- Israeli Trade Act -- Balance of Payments Program Certificate.* (Applies only if the clause at FAR 52.225-3, Buy American Act -- North American Free Trade Agreement Israeli Trade Act -- Balance of Payments Program, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(1)(ii) or (g)(1)(iii) of this provision, is a domestic end product as defined in the clause of this solicitation entitled "Buy American Act -- North American Free Trade Agreement Israeli Trade Act -- Balance of Payments Program" and that the offeror has considered components of unknown origin to have been mined, produced, or manufactured outside the United States.

(ii) The offeror certifies that the following supplies are NAFTA country end products or Israeli end products as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program":

NAFTA Country or Israeli End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(iii) The offeror shall list those supplies that are foreign end products (other than those listed in paragraph (g)(1)(ii) or this provision) as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli

Trade Act-Balance of Payments Program." The offeror shall list as other foreign end products those end products manufactured in the United States that do not qualify as domestic end products.

Other Foreign End Products:

LINE ITEM NO.	COUNTRY OF ORIGIN

[List as necessary]

(iv) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25.

(2) *Buy American Act-North American Free Trade Agreements-Israeli Trade Act-Balance of Payments Program Certificate, Alternate I (Feb 2000)*. If Alternate I to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)

(ii) The offeror certifies that the following supplies are Canadian end products as defined in the clause of this solicitation entitled "Buy American Act-North American Free Trade Agreement-Israeli Trade Act-Balance of Payments Program":

Canadian End Products

Line Item No.: _____

[List as necessary]

(3) *Buy American Act-North American Free Trade Agreements-Israeli Trade Act-Balance of Payments Program Certificate, Alternate II (Feb 2000)*. If Alternate II to the clause at FAR 52.225-3 is included in this solicitation, substitute the following paragraph (g)(1)(ii) for paragraph (g)(1)(ii) of the basic provision:

(g)(1)(ii) The offeror certifies that the following supplies are Canadian end products or Israeli end products as defined in the clause of this solicitation entitled ``Buy American Act--North American Free Trade Agreement--Israeli Trade Act--Balance of Payments Program':

Canadian or Israeli End Products

Line Item No.:	Country of Origin:

[List as necessary]

(4) *Trade Agreements Certificate*. (Applies only if the clause at FAR 52.225-5, Trade Agreements, is included in this solicitation.)

(i) The offeror certifies that each end product, except those listed in paragraph (g)(4)(ii) of this provision, is a U.S.-made, designated country, Caribbean Basin country, or NAFTA country end product, as defined in the clause of this solicitation entitled ``Trade Agreements.''

(ii) The offeror shall list as other end products those end products that are not U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products.

Other End Products

Line Item No.:	Country of Origin:

[List as necessary]

(iii) The Government will evaluate offers in accordance with the policies and procedures of FAR Part 25. For line items subject to the Trade Agreements Act, the Government will evaluate offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products without regard to the restrictions of the Buy American Act or the Balance of Payments Program. The Government will consider for award only offers of U.S.-made, designated country, Caribbean Basin country, or NAFTA country end products unless the Contracting Officer determines that there are no offers for such products or that the offers for such products are insufficient to fulfill the requirements of the solicitation.

(h) *Certification Regarding Debarment, Suspension or Ineligibility for Award (Executive Order 12549)*. (Applies only if the contract value is expected to exceed the simplified acquisition threshold.) The offeror certifies, to the best of its knowledge and belief, that --

(1) The offeror and/or any of its principals * are, * are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(2) * Have, * have not, within the three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, state or local government contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property;

(3) * Are, * are not presently indicted for, or otherwise criminally or civilly charged by a Government entity with, commission of any of these offenses; and

(4)

(i) The offeror, aside from the offenses enumerated in paragraphs (1), (2), and (3) of this paragraph (h), *has *has not within the past three years, relative to tax, labor and employment, environmental, antitrust, or consumer protection laws--

(A) Been convicted of a Federal or state felony (or has any Federal or state felony indictments currently pending against them); or

(B) Had a Federal court judgment in a civil case brought by the United States rendered against them; or

(C) Had an adverse decision by a Federal administrative law judge, board, or commission indicating a willful violation of law.

(ii) If the offeror has responded affirmatively, the offeror shall provide additional information requested by the Contracting Officer.

(i) Certification Regarding Knowledge of Child Labor for Listed End Products (Executive Order 13126). [The Contracting Officer must list in paragraph (i)(1) any end products being acquired under this solicitation that are included in the List of Products Requiring Contractor Certification as to Forced or Indentured Child Labor, unless excluded at 22.1503(b).]

(1) Listed End Product

Listed End Product	Listed Countries of Origin:

(2) Certification. [If the Contracting Officer has identified end products and countries of origin in paragraph (i)(1) of this provision, then the offeror must certify to either (i)(2)(i) or (i)(2)(ii) by checking the appropriate block.]

[] (i) The offeror will not supply any end product listed in paragraph (i)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product.

[] (ii) The offeror may supply an end product listed in paragraph (i)(1) of this provision that was mined, produced, or manufactured in the corresponding country as listed for that product. The offeror certifies that it has made a good faith effort to determine whether forced or indentured child labor was used to mine, produce, or manufacture any such end product furnished under this contract. On the basis of those efforts, the offeror certifies that it is not aware of any such use of child labor.

(End of Provision)

Alternate I (Oct 2000). As prescribed in 12.301(b)(2), add the following paragraph (c)(10) to the basic provision:

(10) (Complete if the offeror has represented itself as disadvantaged in paragraph (c)(2) or (c)(9) of this provision.) [*The offeror shall check the category in which its ownership falls*]:

___ Black American.

___ Hispanic American.

___ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

___ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory or the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).

___ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

___ Individual/concern, other than one of the preceding.

Alternate II (Oct 2000). As prescribed in 12.301(b)(2), add the following paragraph (c)(9)(iii) to the basic provision:

(iii) Address. The offeror represents that its address ___ is, ___ is not in a region for which a small disadvantaged business procurement mechanism is authorized and its address has not changed since its certification as a small disadvantaged business concern or submission of its application for certification. The list of authorized small disadvantaged business procurement mechanisms and regions is posted at <http://www.arnet.gov/References/sdbadjustments.htm>. The offeror shall use the list in effect on the date of this solicitation. "Address," as used in this provision, means the address of the offeror as listed on the Small Business Administration's register of small disadvantaged business concerns or the address on the completed application that the concern has submitted to the Small Business Administration or a Private Certifier in accordance with 13 CFR part 124, subpart B. For joint ventures, "address" refers to the address of the small disadvantaged business concern that is participating in the joint venture.

Alternate III (Oct 2000). As prescribed in 12.301(b)(2), add the following paragraph (c)(11) to the basic provision:

(11) *HUBZone small business concern*. [*Complete only if the offeror represented itself as a small business concern in paragraph (c)(1) of this provision.*] The offeror represents as part of its offer that-

(i) It ___ is, ___ is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns Maintained by the

Small Business Administration, and no material change in ownership and control, principal place of ownership, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It ____ is, ____ is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (c)(11)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating on the joint venture. [*The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:* _____.] Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

ATTACHMENT 1

SPECIFICATION FOR REPLACEMENT OF HALON TOTAL FLOODING FIRE EXTINGUISHING SYSTEMS ON THE US ARMY LANDING CRAFT UTILITY, 2000 CLASS (LCU-2000)

May 2001

Issued By:

**USDOT/RSPA
Volpe National Transportation Systems Center
Technology Applications and Deployment Division
DTS-35
55 Broadway, Kendall Square
Cambridge, MA 02142**

Attachment 1

U.S. ARMY ONBOARD CREW REQUIREMENTS:

This Modification does not require the vessel to be dry docked in order to complete. **The crew or shoreside support are responsible to provide daily access to the vessel (dockside) six days per week, from approximately 0630-1630.** The Army is responsible to maintain security access to the vessel. The Skipper and Chief Engineer or designated Army POC will be invited to attend a daily briefing and attend a weekly production meeting, and will ensure that no crewmembers direct the contractors or interfere with the contractors in the performance of their work, however, any immediate concerns with safety can and should be enforced. Direction of contractor activities is the responsibility of the designated CO and COTR. The Senior Officers/Army POC should familiarize themselves with the SOW, Health and Safety Plan, drawings, and installation specification developed specifically for this program.

The following is a list of crew/Army POC preparation requirements:

1. Provide daily access and safe gangway access to the vessel.
2. Provide shore power for vessels hotel services..
3. After the gas free certificates have been issued, ensure that no engines are operated, or vessel is moved to compromise the certifications.
4. Clean (good housekeeping) of main engine room, pipe tunnel, bow thruster space, emergency generator space, and paint locker. Remove any unnecessary clutter.
5. Ensure all vent closures, including main engine room ventilation dampers (port and starboard) are in proper working condition
6. Do not interfere with contractors work progress.
7. COTR will document condition of deck plates and general condition of work areas (take pictures), with senior officer and contractor supervisor present, prior to start of work. It is the contractor's responsibility to restore spaces to same condition after work is completed.
8. Secure tools and spaces above main deck area.
9. There will be no assistance available from the Army for crane service, electrical power, or for the removal of supplies and/or interferences from various spaces. The contractor will be completely self sufficient for the entire job.
10. Supplies removed from the spaces, will be stored on deck under a tarp or out of way in the various spaces below deck.
11. The Army will provide an area in close proximity to the vessel for storage of a contractor supplied container.

CONTRACTOR REQUIREMENTS:

INSTALLATION SPECIFICATION – Replacement of Halon 1301 Total Flooding Fire Extinguishing Systems onboard the LCU-2000 Watercraft.

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	General Requirements	4
2.0	Preliminary Shipcheck	9
3.0	Existing Halon 1301 System Removals	9
4.0	Engine Room FM-200 System Installation	12
5.0	Engine Room/MCC Area FM-200 System Installation	14
6.0	Tunnel FM-200 System Installation	16
7.0	Bow Thruster Room FM-200 System Installation	19
8.0	A/C and Emerg. Generator Room FM-200 System Installation	21
9.0	Paint Locker FM-200 System Installation	23
10.0	Modification of Engine Room Door	25
11.0	Installation of Paint Locker Natural Supply and Powered Exhaust Vents	26
12.0	Installation of A/C and Emerg. Generator Room Door Holder Assembly	28
13.0	Installation of Tunnel Vent Covers	29
14.0	Installation of Tunnel Vent Closure Hand Wheel	31
15.0	Electrical System Modifications	32
16.0	Installation of Engine Room Water Washdown System	37
17.0	Installation of Tunnel Water Washdown System	39
18.0	Installation of Bow Thruster Room Water Washdown System	42
19.0	Installation of A/C and Emergency Generator Room Automatic Fire Dampers.	43

1.0 GENERAL REQUIREMENTS

1.1. Scope of Work: This Installation Specification establishes the requirements for the Contractor to furnish all labor, material, and equipment required to accomplish Replacement of Halon Total Flooding Fire Extinguishing Systems onboard one (1) U.S. Army Landing Craft Utility (LCU-2014) class of vessel. The contract also provides for seven (7) optional vessel installations. Replacement of the Halon Total Flooding Fire Extinguishing Systems onboard the LCU-2000 class vessels shall be complete and carried out in conformance with the Statement of Work, this specification and the Detailed Design Drawings, and clauses, terms, and conditions of the contract.

1.2. Contract Data:

1.2.1. Contract Number: TBD

1.2.2. Issuing Agency: Volpe National Transportation Systems Center

1.2.3. CO: Kathleen Regan

1.2.4. COTR: Mario Caputo

1.2.5. Contractor: TBD

1.3. Definitions:

1.3.1. Disturbed Areas: Painted surfaces which are disturbed, soiled, or marred during accomplishing this work specified herein, and any changes thereto.

1.3.2. Reinstall: To place back in designed position, remount, and reconnect.

1.3.3. Replace: To supply an equivalent new item, to furnish and install.

1.3.4. PSI: PSI and psi shall be interpreted as “psig”.

1.3.5. TDP: Technical Data Package – Installation Specification and Detailed Design Drawings

1.3.6. Interferences – any equipment or materials in way of accomplishing this work installation. Minor interferences shall be removed and replaced by the contractor, and may include piping, ductwork, wiring, shelving, etc. Major interferences will be addressed with the COTR and contractor during the contractor ship-check.

1.4. References:

1.4.1. Government Documents: The following documents form a part of this specification.

1.4.1.1. 29 CFR, Part 1910.1001, Asbestos.

- 1.4.1.2. 29 CFR, Part 1915, Safety and Health Regulations for Shipyard Employment.
- 1.4.1.3. 33 CFR, Part 155, Oil or Hazardous Material Pollution Prevention Regulations for Vessels.
- 1.4.1.4. 46 CFR , Parts 50 through 64, Subchapter F, Marine Engineering.
- 1.4.1.5. 46 CFR, Parts 90 through 106, Subchapter I, Cargo and Miscellaneous Vessels.
- 1.4.1.6. 46 CFR, Parts 110 through 113, Subchapter J, Electrical Engineering.
- 1.4.1.7. 46 CFR, Parts 159 through 164, Subchapter Q, Equipment, Construction, and Materials: Specifications and Approval.
- 1.4.1.8. 48 CFR Part 217.71, Master Agreement for the Repair and Alteration of Vessels, or Agreement for Boat Repairs.
- 1.4.1.9. Department of the Army Painting of Watercraft Technical Bulletin, TB 43-0144.
- 1.4.1.10. Department of the Army Arc Welding on Water-Borne Vessels Technical Bulletin, TB 55-1900-204-24.

1.5. Other Publications: The following documents form a part of this specification. Unless otherwise specified, the issue in effect on the date of contract award shall apply.

- 1.5.1. ASTM F 683, Standard Practice for Selection and Application for Thermal Insulation for Piping and Machinery.
- 1.5.2. ASTM F 708, Standard Practice for Design and Installation of Rigid Pipe Hangers.
- 1.5.3. ASME B1.20.1, Pipe Threads, General Purpose.
- 1.5.4. IEEE Std 45, IEEE Recommended Practice for Electric Installations on Shipboard.

1.6. Government Furnished Electronic Drawings: Refer to ***Attachment 2***.

LCU2000-97-555-001,Rev A	LCU 2000 Class Fire Control and Emergency Equipment Plan (1 sheet).
LCU-2000-5553-1	US Army LCU-2000 FM-200 System Piping Installation and Details (28 sheets).
LCU-2000-5553-2	US Army LCU-2000 FM-200 System Miscellaneous Mods (6 sheets).
LCU-2000-5553-3	US Army LCU-2000 FM-200 System Electrical Modifications (12 sheets).
LCU-2000-5553-4	US Army LCU-2000 FM-200 System Label Plates and Placards (12 sheets).
LCU-2000-5231-1	US Army LCU-2000 Water Washdown System Piping Installation and Details (12 sheets).
LCU-2000-5231-2	US Army LCU-2000 Water Washdown System Label Plates and Placards (3 sheets).

1.7. Government Documents:

1.7.1. The contractor shall follow the Health and Safety Plan (HASP) for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard U.S. Army Watercraft. Refer to ***Attachment 3***.

1.7.2. LCU-2K-97-5553-TEST, Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the U.S. Army Landing Craft Utility (LCU-2000). Refer to ***Attachment 4***.

1.8. Order of Precedence: In the event of a conflicting requirement contained in these regulations, specifications, drawings or other contractual documents, the more restrictive shall apply.

1.9. Painting and Finishing:

1.9.1. Surfaces of new and disturbed areas shall be cleaned, treated, primed, and painted/touched up in accordance with TB 43-0144. (1 coat of primer, and two finish coats).

1.9.2. All surfaces to be painted shall be free of dirt, oil, grease, moisture, or any foreign material, which would affect the adhesion of primer and paint. All disturbed, burned, or scarred areas, burrs, projections, and new metal surfaces and areas shall be ground smooth or cleaned by power wire brush or other means prior to priming, finishing and/or touch-up painting.

1.9.3. All new and disturbed piping shall be cleaned to a condition which results in a surface that is free of contamination (grease, rust, or scale) for the proper adhesion of primer and paint.

1.10. Government Furnished Equipment: None.

1.11. Workmanship:

1.11.1. All work shall be performed in accordance with good marine practice and shall satisfy the standards, regulations, requirements, and recommended practices of those documents identified herein.

1.11.2. All material and equipment shall be suitably bracketed, supported, and secured to carry the weight, prevent excessive vibration, and inertial forces resulting from rolling and pitching of the vessel.

1.11.3. Watertight integrity of the vessel shall be maintained. Piping or wiring passing through a watertight deck or watertight bulkhead shall be made watertight by methods and fixtures identified in the TDP. Where cables, fittings, or any other items are removed, the resulting opening shall be blanked off flush with welded plates of the same material and thickness as the parent metal.

1.11.4. Temporary access openings are not authorized.

1.11.5. New thermal and other insulation shall be free of asbestos. Selection and application of thermal insulation material shall be made using ASTM F 683 as a guide.

1.12. Protection of Equipment: Appropriate measures shall be taken to prevent damage to shipboard equipment. Equipment, which may become damaged during installation operations such as grinding and welding, shall be suitably covered and protected from damage.

1.13. Welding:

1.13.1. Prior to performing any welding, burning, grinding, or other hot work, the contractor shall be responsible to ensure the area has been certified "Safe for Workers and Safe for Hot Work" in accordance with 29 CFR 1915.

1.13.2. The crew will assist with pumping bilges using the onboard pumps if facilities are available to off-load the bilge water. The contractor is ultimately responsible to clean and gas free the bilges for gas free certificate. Once the certificate is issued, the crew is responsible to help maintain the certificate by not operating any equipment in effected spaces, or move the vessel.

1.13.3. Rigid control of welding and grounding shall be maintained to protect the vessel's hull and machinery. Care shall be taken to ensure the polarity and ground connections of welding machines shall not damage the vessel. No arc welding shall be permitted until the contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

1.13.4. Prior to and during any welding or burning, a fire watch shall be posted. All equipment in the way of burning or welding shall be covered with fireproof covering provided by the contractor. Insulation in way of burning or welding shall be removed and reinstalled or other protective measures taken.

1.13.5. No welding shall be permitted in connection with alterations and installations unless the welder at the time has a valid qualification record, certified by the U.S. Coast Guard, the American Bureau of Shipping, or other agency approved by the COTR. The welder's qualifications shall be appropriate for the particular service application, filler material type, position of welding, and welding process involved with the work being undertaken.

1.13.6. Filler metal used throughout the work shall be suitable for use with the parent metal at each weld. Welding procedure, as to direction, length, number and sequence of beads shall be carefully planned to minimize stresses. Undercutting in excess of 1/64 inch, piling, and non-penetration shall not be permitted.

1.13.7. Striking of an arc on any principal metal plate surface or component of the vessel, unless the surface on which the arc is struck is to be incorporated in a welded joint, is prohibited. Marks left by an accidental striking of an arc shall be ground smooth, taking care the plate thickness is not reduced more than ten (10) percent.

1.14. Health and Safety: Health and Safety requirements are defined in the Health and Safety Plan (HASP) for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard U.S. Army Watercraft, which has been prepared for this project. The HASP requires minor updating by the contractor (Point of Contact's, phone numbers, emergency phone numbers, local information, etc.).

1.15. Pollution Control: The contractor shall comply with the requirements identified in the HASP as well as 33 CFR and other applicable local, state, and/or federal requirements for environmental protection of the atmosphere, land, and waters.

1.16. Fire Protection: Fire protection requirements are identified in the HASP prepared for this project.

1.17. Testing: Testing shall be conducted in accordance with LCU-2K-5553-TEST.

1.18. General Notes:

NOTE

1. FM-200 Recalculation Guidelines – FM-200 Flow Calculations shall be rerun by the contractor (using UL approved Kidde flow program) and submitted to the Volpe Center prior to installing, if the system piping or mass of agent is changed (deviations), as a result of the shipcheck. Any deviations in routing of piping (the addition or subtraction of more than 10% in volume of any pipe run defined as: cylinder to a tee, tee to a tee, and tee to a nozzle) or the addition or subtraction of fittings, or reorientation of T's, shall constitute a deviation (design change). A change of mass of agent would be required if an adjustment to the volume of the protected space above the bilge plates varies by more than +/- 5 percent due to gross volume change or the addition or subtraction of major equipment (net volume). Any design changes (during shipcheck) must be proposed to the Volpe Center COTR in writing, and will be reviewed and approved by the government prior to installation. The registered P.E. will be furnished by the government. The government (Volpe Center) will be responsible to evaluate the gross and net volume changes in relation to the LCU-2034 prototype (class) design. This volume information will be provided during the shipcheck. Note – Volpe Center is responsible for developing the as-built documentation, and any unauthorized field deviations to FM-200 systems are the contractors full responsibility and the contractor shall be required to provide updated calculations (proving system continues to meet flow design parameters), prior to final acceptance by the government.

2. WWS Recalculation Guidelines - Any minor deviations in routing of system piping or numbers of fittings (10% rule) must be approved by the Volpe Center COTR prior to installation. Any major deviations shall be approved by the contractor Design Engineer, and approved by the Volpe Center COTR and the Registered Professional Engineer (FP) prior to installation.

3. FM-200 and WWS System piping, installed in the overhead, shall be as high as practical (minimum of 6 feet 3 inches) and clear of all lifting eyes, bolted equipment removal panels, and equipment removal routes. Pipe runs shall follow detailed design drawing dimensions to maximum extent possible.

4. CO₂ actuation tubing shall be mounted high in the overhead and clear of all lifting eyes, bolted equipment removal panels, and equipment removal routes. Where actuation tubing is subject to damage, adequate protection shall be provided.

5. Installation of discharge nozzles and connection of cylinder assemblies shall be performed by the Tech. Rep. and shall occur after FM-200 System piping has been pneumatically tested and approved by the Volpe Center. Nozzles shall provide a clear overhead height of 6' 5" from the deckplates.

6. Halon 1301 cylinders and agent remain the property of the U.S. Army. Cylinders and agent shall be properly marked, transported and turned in to the Defense Depot, Richmond, VA.

7. Installation of WWS spray nozzles and nozzle guards shall occur after WWS piping has been hydrostatically tested and approved by the Volpe Center.

2.0 PRELIMINARY SHIPCHECK

2.1. Installation Shipcheck: No less than thirty (30) days prior to the scheduled installation date, the contractor shall conduct a ship-check of the individual scheduled vessel at it's homeport. The ship-check objectives are to plan the work installation, evaluate the protected space integrities, red line the class drawing for fit, arrange for any support services, and determine any problems which may effect the installations (i.e., interference problems and any necessary piping configuration changes). Coordination of ship-check shall be with the Volpe Center COTR. The contractor shall be responsible for all minor deviations. Major deviations (greater than 10% change of any FM-200 pipe run sections, or changes greater than 20% to any bill of materials listed in the design drawings (excluding cylinders and FM-200 agent), will constitute a change beyond the original scope of work and will be negotiated with the contractor.

2.2. Enclosure Integrity Inspection: The contractor shall visually inspect and evaluate the enclosure integrity of each space to be protected and provide written inspection reports to the COTR regarding the relative air tightness of the spaces. Any openings in the opinion of the contractor, which will result in the gaseous agents inability to maintain the 15-minute required hold time, shall be brought to the attention of the COTR for correction. The contractor shall repair minor openings (i.e. – abandoned cable or pipe penetrations) as part of this work effort. For major repairs, cost estimates and repair schedules shall be provided to the COTR for evaluation. The contractor shall provide written ship-check inspection, and enclosure integrity inspection results within seven (7) days of the ship-check to the COTR identifying the problems found and proposing solutions, including color pictures of any problem areas found, as warranted.

3.0 EXISTING HALON 1301 SYSTEM REMOVALS.

3.1. Technical Data:

3.1.1. SOW titled, REPLACEMENT OF HALON 1301 TOTAL FLOODING FIRE EXTINGUISHING SYSTEMS ONBOARD U.S. ARMY LCU-2000 WATERCRAFT WITH FM-200 AND WATER WASHDOWN SYSTEMS **WITH OPTIONS FOR SEVEN (7) ADDITIONAL WATERCRAFT**.

3.1.2. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

3.1.3. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

3.1.4. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

3.2. General Requirements:

3.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

3.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

3.2.3. Existing insulation, joiner work, or ceiling tiles disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

3.2.4. All watertight boundary penetrations abandoned by the removal of Halon fire extinguishing systems and vessel modifications shall be welded closed. Other abandoned bulkhead, deck, and framing penetrations shall be welded closed and all brackets removed. All welded fittings shall be ground flush, primed, and painted in accordance with TB 43-0144.

3.3. Removals:

3.3.1. Engine Room Halon 1301 System.

3.3.1.1. Remove existing Control Valve and Stop Valve actuation cables from stop valve and CO₂ cylinder in A/C and Emergency Generator Room to Engine Room pull station located in Main Deck Passageway including pull boxes and cable conduit. Retain existing pull box mounting bracket for reuse.

3.3.1.2. Disconnect and remove two (2) existing 350 lb Halon 1301 cylinder assemblies located in A/C and Emergency Generator Room. Remove existing cylinder foundation.

3.3.1.3. Disconnect and remove existing 50 lb CO₂ cylinder assembly located in A/C and Emergency Generator Room. Remove existing cylinder foundation.

3.3.1.4. Remove existing pressure operated siren piping including pipe, fittings, pipe hangers, siren, and siren bracket between CO₂ actuation piping in the A/C and Emergency Generator Room and siren located in the Engine Room. Note- the four amber strobe lights may be reused.

3.3.1.5. Remove existing CO₂ actuation piping including pipe, fittings, pipe hangers, existing pressure switches, and discharge delay between former CO₂ cylinders and Engine Room Halon 1301 cylinders in A/C and Emergency Generator Room.

3.3.1.6. Remove existing Halon 1301 discharge piping system including pipe, fittings, nozzles, and pipe hangers from former Halon 1301 cylinder location in A/C and Emergency Generator Room to nozzles in Engine Room.

3.3.1.7. Remove existing Halon 1301 label plates and placards from locations in A/C and Emer Gen Room Machinery Room, Main Deck Passageway, and Engine Room.

3.3.2. Paint Locker Halon 1301 System.

3.3.2.1. Remove existing Control Valve and Stop Valve actuation cables from stop valve and Halon 1301 cylinder on exterior Main Deck, BHD 13, and valve control pull boxes, located exterior Main Deck BHD 13, including pull boxes and cable conduit. Note – cable pull conduit from engine room exit door in overhead to the mess deck may be reused with the condition that corner pulleys are inspected, lubricated, and replaced if necessary.

3.3.2.2. Disconnect and remove existing Halon 1301 cylinder assembly located on exterior Main Deck, BHD 13. Remove existing cylinder foundation.

3.3.2.3. Disconnect and remove existing 50 lb CO₂ cylinder assembly located on exterior Main Deck, BHD 13. Remove existing cylinder foundation.

Note – Caution shall be used when removing these Halon/CO₂ cylinders, due to long term exposure to outside corrosive elements. The contractor shall be prepared to handle and transport these cylinders in condemned status.

3.3.2.4. Remove existing pressure operated siren piping including pipe, fittings, pipe hangers, siren, and siren bracket between CO₂ actuation piping on exterior Main Deck, BHD 13, and siren located in the Paint Locker. Note – reuse siren with new FM-200 system.

3.3.2.5. Remove existing CO₂ actuation piping including pipe, fittings, pipe hangers, existing pressure switch, and discharge delay between former CO₂ cylinder and Halon 1301 cylinder on exterior Main Deck, BHD 13.

3.3.2.6. Remove existing Halon 1301 discharge piping system including pipe, fittings, nozzle, and pipe hangers between former Halon 1301 cylinder location on exterior Main Deck, BHD 13, to nozzle in Paint Locker.

3.3.2.7. Remove existing Halon 1301 label plates and placards from locations on exterior Main Deck, BHD 13, and in Paint Locker.

3.3.3. Disturbed areas not associated with the installation shall be cleaned and painted in accordance with TB 43-0144.

4.0 ENGINE ROOM FM-200 SYSTEM INSTALLATION.

4.1. Technical Data:

4.1.1. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

4.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

4.1.3. Sketch SK1-LCU-2000-5553-1, titled: Engine Room FM-200 System Actuation Cable Conduit.

4.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

4.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

4.1.6. LCU-2000-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class.

4.2. General Requirements:

4.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

4.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

4.2.3. Existing insulation, joiner work, or ceiling tiles disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

4.3. Removals: See Item 3.0.

4.4. Installation: (Refer to Drawing LCU-2000-5553-1, Drawing LCU-2000-5553-4, and Sketch SK1-LCU-2000-5553-1, attached).

4.4.1. Install Engine Room FM-200 System cylinder foundation in A/C and Emergency Generator Room, on aft side of BHD 42 1/2 and Engine Room CO₂ cylinder foundation in A/C and Emergency Generator Room, port side, near FR 44.

4.4.2. Install the FM-200 discharge piping from Engine Room FM-200 cylinder location in A/C and Emergency Generator Room to FM-200 discharge nozzles in Engine Room including piping, fittings, and bulkhead penetration.

- 4.4.3. Install CO₂ actuation piping in A/C and Emergency Generator Room between Engine Room CO₂ cylinder and Engine Room FM-200 cylinders including hoses, piping, fittings, 60 second time delay, Engine Room pressure switch PS-1, and Engine Room pressure switch PS-2.
- 4.4.4. Install CO₂ actuation tubing between Engine Room CO₂ actuation piping in A/C and Emer. Gen. Room and Engine Room/MCC Area FM-200 cylinder location in Tunnel including tubing, fittings, piping, and bulkhead penetrations.
- 4.4.5. Install CO₂ actuation vent from CO₂ actuation piping in A/C and Emergency Generator Room to Main Deck Weather, including vent fitting, check valve, bulkhead penetration, piping, fittings, and piping hangers. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.
- 4.4.6. Install one (1) 25 lb Engine Room CO₂ cylinder assembly in A/C and Emer. Gen. Room.
- 4.4.7. Install system actuation cable from Engine Room CO₂ cylinder in A/C and Emer. Gen. Room to Engine Room interior pull station, located on the inboard bulkhead of Passageway on Main Deck near FR 40, including break glass pull box, dual pull mechanism, cable, and 3/8" galvanized steel conduit. Changes in direction may only be accomplished using corner pulleys.
- 4.4.8. Install system actuation cable from dual pull mechanism to Engine Room exterior pull station located on Main Deck, FR 28, centerline, including watertight pull box, cable, and conduit.
- 4.4.9. Install the Engine Room sampling port in bottom of Engine Room WWS Control Station box, located on the inboard bulkhead of Passageway on Main Deck between FR 40 and FR 41, including piping and fittings.
- 4.4.10. Install Engine Room FM-200 System piping and adequately support to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5553-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.
- 4.4.11. Prior to installation of discharge nozzles and connection of cylinders, the Engine Room FM-200 System piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.
- 4.4.12. Install the eight (8), FM-200 discharge nozzles in the Engine Room system.
- 4.4.13. Install two (2) 600 lb Engine Room FM-200 cylinder assemblies in A/C and Emer. Gen. Room.
- 4.4.14. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.
- 4.4.15. Install the label plates and system operation placard iaw with Drawing LCU-2000-5553-4.

4.5. Testing: Engine Room FM-200 System installation shall be tested in accordance with LCU-2K-97-5553-TEST.

5.0 ENGINE ROOM/MCC AREA FM-200 SYSTEM INSTALLATION.

5.1. Technical Data:

5.1.1. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

5.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

5.1.3. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

5.1.4. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

5.1.5. LCU-2000-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the U.S. Army Landing Craft Utility, 2000 Class (LCU-2000).

5.2. General Requirements:

5.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

5.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

5.2.3. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

5.3. Removals: See Item 3.0.

5.4. Installation: (Refer to Drawing LCU-2000-5553-1 and Drawing LCU-2000-5553-4).

5.4.1. Install Engine Room/MCC Area FM-200 System cylinder foundation in Tunnel, stbd side, longitudinal BHD, 7'-0" off CL, between FR 23 and FR 24.

5.4.2. Install the FM-200 discharge piping from Engine Room/MCC Area FM-200 cylinder location in Tunnel to FM-200 discharge nozzles in Engine Room/MCC Area and Engine Room/MCC Area bilge including piping, fittings, and bulkhead penetrations.

5.4.3. Install the CO₂ actuation hose at termination of Engine Room CO₂ actuation tubing/piping from A/C and Emergency Generator Room in Tunnel at Engine Room/MCC Area FM-200 cylinder location. Note – ensure tubing is hung high in overhead away from areas where can be subjected to damage.

5.4.4. Engine Room/MCC Area FM-200 System piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5553-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

5.4.5. Prior to installation of discharge nozzles and connection of cylinders the Engine Room/MCC Area FM-200 System Piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.

5.4.6. Install six (6) FM-200 discharge nozzles in Engine Room/MCC Area.

5.4.7. Install one (1) 350 lb Engine Room/MCC Area FM-200 cylinder assembly in Tunnel.

5.4.8. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

5.4.9. Install the label plates and system operation placard in accordance with Drawing LCU-2000-5553-4.

5.5. Testing: Engine Room/MCC Area FM-200 System installation shall be tested as part of Engine Room FM-200 System testing in accordance with LCU-2K-97-5553-TEST.

6.0 TUNNEL FM-200 SYSTEM INSTALLATION.

6.1. Technical Data:

6.1.1. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

6.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

6.1.3. Sketch SK2-LCU-2000-5553-1, titled: Tunnel FM-200 Actuation Cable Conduit.

6.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

6.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

6.1.6. LCU-2000-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the U.S. Army Landing Craft Utility, 2000 Class (LCU-2000).

6.2. General Requirements:

6.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

6.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

6.2.3. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

6.3. Removals/Relocation:

6.3.1. Disconnect electrical cable P211-2 from P211-2 Tunnel Supply Fan Controller located in Engine Room/MCC Area, port side, longitudinal BHD, 7'-0" off CL, near FR 24 1/2. Retain cable and stuffing tubes for reconnection to relocated controller.

6.3.2. Disconnect electrical cable P211-2 (MOT) from P211-2 Tunnel Supply Fan Controller (located in Engine Room/MCC Area, port side, longitudinal BHD, 7'-0" off CL, near FR 24 1/2), and Tunnel Supply Fan, (located in Machine Shop). Remove and discard electrical cable P211-2 (MOT). Retain stuffing tubes for connection of new cable to relocated controller.

6.3.3. Relocate P211-2 Tunnel Supply Fan Controller from Engine Room/MCC Area, port side, longitudinal BHD 7'-0" off CL, near FR 24 1/2 to Engine Room/MCC Area, stbd side, longitudinal BHD 7'-0" off CL, near FR 28 including installation of controller foundation.

6.4. Installation: (Refer to Drawing LCU-2000-5553-1, Drawing LCU-2000-5553-4, and Sketch SK2-LCU-2000-5553-1, attached).

6.4.1. Install Tunnel FM-200 System cylinder foundation in Engine Room, port side, between FR 26 and 27 and Tunnel CO₂ cylinder foundation in Engine Room, port side, between FR 25 and 26.

NOTE

Refer to alternate location for 25 lb CO₂ actuation cylinder noted on detailed design drawing. Determine if adequate space is available for this alternate location. If there is adequate space, the contractor shall install the control cylinder in this alternate location. Only top half of cylinder foundation bracket is required to be welded to bulkhead so as to keep from burning through into water tank.

6.4.2. Install FM-200 discharge piping from Tunnel FM-200 cylinder location in Engine Room to FM-200 discharge nozzles in Tunnel and Tunnel bilge, including piping, fittings, and bulkhead penetration.

6.4.3. Install CO₂ actuation piping in Eng. Rm. between Tunnel CO₂ cylinder and Tunnel FM-200 cylinder including hoses, piping, fittings, 60 second time delay, and Tunnel pressure switch PS-5.

6.4.4. Install CO₂ actuation vent from CO₂ actuation piping in Engine Room/MCC Area to Main Deck Weather, Port side Passageway, including vent fitting, tubing, fittings, bulkhead penetrations, piping, and piping hangers. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

6.4.5. Install one (1) 25 lb Tunnel CO₂ cylinder assembly in Engine Room/MCC Area.

6.4.6. Install system actuation cable from Tunnel CO₂ cylinder in Eng. Rm. to Tunnel interior pull station located in Engine Room, including break glass pull box, dual pull mechanism, cable, and conduit.

6.4.7. Install system actuation cable from dual pull mechanism to Tunnel exterior pull station located on Main Deck, centerline, BHD 28, including watertight pull box, cable, and conduit.

6.4.8. Install Tunnel sampling port in Engine Room, aft side of BHD 25, inboard of Tunnel WTRTT door, including piping, and fittings.

6.4.9. Tunnel FM-200 System piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5553-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

- 6.4.10. Prior to installation of discharge nozzles and connection of cylinders the Tunnel FM-200 System Piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.
- 6.4.11. Install five (5) FM-200 discharge nozzles in Tunnel. Note – nozzles shall be away from main walkways and a minimum of 6 feet 3 inches from deckplates.
- 6.4.12. Install one (1) 600 lb Tunnel FM-200 cylinder assembly in Engine Room/MCC Area.
- 6.4.13. Reroute and reconnect electrical cable P211-2 to relocated P211-2 Tunnel Supply Fan Controller
- 6.4.14. Install new electrical cable P211-2 (MOT) from relocated P211-2 Tunnel Supply Fan Controller to Tunnel Supply Fan.
- 6.4.15. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.
- 6.4.16. Install label plates and system operation placards in accordance with Drawing LCU-2000-5553-4.
- 6.5. Testing: The Tunnel FM-200 System installation shall be tested in accordance with LCU-2K-97-5553-TEST.

7.0 BOW THRUSTER ROOM FM-200 SYSTEM INSTALLATION.

7.1. Technical Data:

7.1.1. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

7.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

7.1.3. Sketch SK3-LCU-2000-5553-1, titled: Bow Thruster Room FM-200 Actuation Cable Conduit.

7.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

7.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

7.1.6. LCU-2000-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the U.S. Army Landing Craft Utility, 2000 Class (LCU-2000).

7.2. General Requirements:

7.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

7.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

7.2.3. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

7.3. Removals: None.

7.4. Installation: (Refer to Drawing LCU-2000-5553-1, Drawing LCU-2000-5553-4, and Sketch SK3-LCU-5553-1, attached).

7.4.1. Install the Bow Thruster Room FM-200 System cylinder foundation and Bow Thruster Room CO₂ cylinder foundation in Tunnel, port side, between FR 19 and FR 20.

7.4.2. Install FM-200 discharge piping from Bow Thruster Room FM-200 cylinder location in Tunnel to FM-200 discharge nozzles in Bow Thruster Room and Bow Thruster Room bilge, including piping, fittings, and bulkhead penetration.

7.4.3. Install CO₂ actuation piping in Tunnel between Bow Thruster Room CO₂ cylinder and Bow Thruster Room FM-200 cylinder including hoses, piping, fittings, 60 second time delay, Bow Thruster pressure switch PS-6, and Bow Thruster pressure switch PS-7.

7.4.4. Install CO₂ actuation vent from CO₂ actuation piping in Tunnel to Main Deck Weather, port side Passageway, including vent fitting, tubing, fittings, check valve, bulkhead and deck penetrations, piping, and piping hangers. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

7.4.5. Install one (1) 25 lb Bow Thruster Room CO₂ cylinder assembly in Tunnel.

7.4.6. Install system actuation cable from Bow Thruster Room CO₂ cylinder in Tunnel to Bow Thruster Room interior pull station located in Tunnel, including break glass pull box, dual pull mechanism, cable, and conduit.

7.4.7. Install system actuation cable from dual pull mechanism to Bow Thruster Room exterior pull station located on Main Deck, starboard side, BHD 13, including watertight pull box, cable, and conduit.

7.4.8. Install the Bow Thruster Room sampling port in Tunnel, aft side of BHD 17, inboard of Bow Thruster Room WTRTT door, including piping, and fittings.

7.4.9. Bow Thruster Room FM-200 System piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5553-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

7.4.10. Prior to installation of discharge nozzles and connection of cylinders the Bow Thruster Room FM-200 System Piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.

7.4.11. Install three (3) FM-200 discharge nozzles in Bow Thruster Room. Note – provide a minimum of 6 feet 3 inches of headroom from deckplates.

7.4.12. Install one (1) 350 lb Bow Thruster Room FM-200 cylinder assembly in Tunnel.

7.4.13. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

7.4.14. Install the label plates and system operation placards in accordance with Drawing LCU-2000-5553-4.

7.4.15. Install U.S. Coast Guard approved (Dow Corning Firestop 3-6548, or equivalent) silicon RTV Foam in the cable penetration collar located in the port plenum, overhead.

7.5. Testing: Bow Thruster Room FM-200 System installation shall be tested in accordance with LCU-2K-97-5553-TEST.

8.0 A/C AND EMERGENCY GENERATOR ROOM FM-200 SYSTEM INSTALLATION.

8.1. Technical Data:

8.1.1. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

8.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

8.1.3. Sketch SK4-LCU-2000-5553-1, titled: A/C and Emergency Generator FM-200 Actuation Cable Conduit.

8.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

8.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

8.1.6. LCU-2000-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

8.2. General Requirements:

8.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

8.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

8.2.3. Existing insulation, or joiner work disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

8.3. Removals: Existing 1/4" studs on the three (3) exterior vertically mounted vent covers.

8.4. Installation: (Refer to Drawing LCU-2000-5553-1, Drawing LCU-2000-5553-4, and Sketch SK4-LCU-2000-5553-1, attached).

8.4.1. Install A/C and Emergency Generator Room FM-200 System cylinder foundation and A/C and Emergency Generator Room CO₂ cylinder foundation in Stowage Locker, Main Deck, stbd side.

- 8.4.2. Install FM-200 discharge piping from A/C and Emergency Generator Room FM-200 cylinder location in Stowage Locker to FM-200 discharge nozzle in A/C and Emergency Generator Room including piping, fittings, and bulkhead penetrations.
- 8.4.3. Install CO₂ actuation piping in Stowage Locker between A/C and Emer. Gen. Room CO₂ cylinder and A/C and Emergency Generator Room FM-200 cylinder. Install hoses, piping, fittings, 60 second time delay, A/C and Emergency Generator Room pressure switches PS-3 and PS-4.
- 8.4.4. Install CO₂ actuation vent from CO₂ actuation piping in Stowage Locker to Main Deck Weather, including vent fitting, check valve, bulkhead penetration, piping, fittings, and piping hangers. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.
- 8.4.5. Install one (1) 25 lb A/C and Emerg. Gen. Room CO₂ cylinder assembly in Stowage Locker.
- 8.4.6. Install system actuation cable from A/C and Emergency Generator Room CO₂ cylinder in Stowage Locker to A/C and Emergency Generator Room interior pull station located in Main Deck Passageway, including break glass pull box, cable, and conduit.
- 8.4.7. Install A/C and Emergency Generator Room sampling port in Stowage Locker, aft side of BHD 25, inboard of A/C and Emergency Generator Room WTRTT door, including piping, and fittings.
- 8.4.8. Install A/C and Emergency Generator Room FM-200 System piping and adequately support to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5553-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.
- 8.4.9. Prior to installation of discharge nozzles and connection of cylinders the A/C and Emergency Generator Room FM-200 system piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.
- 8.4.10. Install one (1) FM-200 discharge nozzle in A/C and Emergency Generator Room.
- 8.4.11. Install one (1) 125 lb A/C and Emergency Generator Room FM-200 cylinder assembly in Stowage Locker.
- 8.4.12. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.
- 8.4.13. Install the label plates and system operation placards in accordance with Drawing LCU-2000-5553-4.
- 8.4.14. Install metal backed duct tape (approx. 3" wide) to all A/C system ductwork flanges located in the protected space using UL approved tape per drawing bill of material.

8.4.15 - Upgrade the existing vertical mounted vent cover hold down studs and wing-nuts to ½", 316 stainless steel, adjusting for mounting of existing covers, and repair or replace warped covers.

8.5 Testing: A/C and Emergency Generator Room FM-200 System installation shall be tested in accordance with LCU-2K-97-5553-TEST.

9.0 PAINT LOCKER FM-200 SYSTEM INSTALLATION.

9.1. Technical Data:

9.1.1. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

9.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

9.1.3. Sketch SK5-LCU-2000-5553-1, titled: Paint Locker FM-200 Actuation Cable Conduit.

9.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

9.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

9.1.6. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

9.2. General Requirements:

9.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

9.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

9.2.3. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

9.3. Removals: See Item 3.0.

9.4. Installation: (Refer to Drawing LCU-2000-5553-1, Drawing LCU-2000-5553-4, and Sketch SK5-LCU-2000-5553-1, attached).

9.4.1. Install the Paint Locker FM-200 System cylinder foundation in the Bow Thruster Room.

9.4.2. Install FM-200 discharge piping from Paint Locker FM-200 cylinder location in Bow Thruster Room to FM-200 discharge nozzle and siren in Paint Locker including pipe, fittings, Bow Thruster Room pressure switch PS-8, deck penetration, bulkhead penetration, gas siren (re-used from engine room halon system), and siren foundation. Install deck drain from bow thruster plenum to bilges per drawing.

9.4.3. Install system actuation cable between Paint Locker FM-200 cylinder in Bow Thruster Room and remote Paint Locker Cylinder control pull box located on exterior Main Deck on port BHD 13, inboard of Paint Locker WTRTT door, including watertight pull box, cable, conduit, and fittings. Ensure actuation piping vertical rise installed inside the Bow Thruster vent plenum is located behind the existing angle iron column to protect against sea spray. Seal weld these 90 degree elbows within the plenum.

9.4.4. Install Paint Locker FM-200 System HF Gas Sampling Port on exterior Main Deck, on port BHD 13, inboard of Paint Locker WTRTT door.

9.4.5. All Paint Locker FM-200 System piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5553-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

9.4.6. Prior to installation of discharge nozzles and connection of cylinders, Paint Locker FM-200 System piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.

9.4.7. Install the one (1) FM-200 discharge nozzle in Paint Locker.

9.4.8. Install the one (1) 125 lb Paint Locker FM-200 cylinder assembly in Bow Thruster Room.

9.4.9. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

9.4.10. Install the label plates and Paint Locker FM-200 System Operation Placard in accordance with Drawing LCU-2000-5553-4.

9.5. Testing: Paint Locker FM-200 System installation shall be tested in accordance with LCU-2K-97-5553-TEST.

10.0 MODIFICATION OF ENGINE ROOM DOOR.

10.1. Technical Data:

10.1.1. Drawing LCU-2000-5553-2, titled: U.S. Army LCU-2000 FM-200 System Miscellaneous Mods.

10.1.2. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the U.S. Army Landing Craft Utility, 2000 Class (LCU-2000).

10.2. General Requirements:

10.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

10.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

10.3. Removals: None.

10.4. Installation: (Refer to Drawing LCU-2000-5553-2).

10.4.1. Install weather stripping around forward, top, and aft Engine Room door jamb.

10.4.2. Install door sweep along bottom of Engine Room door.

10.5. Testing: Modification of Engine Room door shall be tested in accordance with LCU-2K-97-5553-TEST.

11.0 INSTALLATION OF PAINT LOCKER NATURAL SUPPLY AND POWERED EXHAUST VENT LOUVERS AND COVERS.

11.1. Technical Data:

11.1.1. Drawing LCU-2000-5553-2, titled: U.S. Army LCU-2000 FM-200 System Miscellaneous Mods.

11.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

11.1.3. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

11.1.4. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

11.1.5. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

11.2. General Requirements:

11.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

11.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

11.2.3. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

11.3. Removals:

11.3.1. Remove and discard knife edge, louver cover, of existing Paint Locker powered exhaust louver located between FR 11 and FR 12. New Paint Locker powered exhaust louver shall be installed in space vacated by removal.

11.3.2. Remove and discard knife edge, louver cover, and associated structure of existing Paint Locker natural supply louver located between FR 1 and FR 2. Renew bulkhead plating at opening left by this removal, weld closed, and grind flush.

11.4. Installation: (Refer to Drawing LCU-2000-5553-2)

11.4.1. Fabricate hold down brackets (qty 2).

11.4.2. Installation of the Paint Locker natural supply louver and cover.

11.4.2.1. Provide 12 1/2" wide x 16 1/2" tall cut out in Paint Locker inboard longitudinal bulkhead between FR 4 and FR 5. Relocation is to make cover accessible for ease of closing.

11.4.2.2. Install the louver/cover assembly for the Paint Locker natural supply in cutout of Paint Locker inboard longitudinal bulkhead.

NOTE

Paint Locker natural supply cover shall be installed with hinges mounted on forward side of vessel.

11.4.2.3. With Paint Locker natural supply cover in open position, template location for, and install (qty 1) lower hold down assembly (hold down bracket and hardware).

11.4.3. Installation of the Paint Locker natural exhaust louver and cover.

11.4.3.1. Install bulkhead louver for Paint Locker powered exhaust system in the existing opening in Paint Locker inboard longitudinal bulkhead.

NOTE

Paint Locker powered exhaust cover shall be installed with hinges mounted on aft side of vessel.

11.4.3.2. With Paint Locker powered exhaust cover in open position, template location for and install (qty 1) lower hold down assembly (hold down bracket and hardware).

11.4.4. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

11.4.5. Install label plates in accordance with Drawing LCU-2000-5553-4.

11.5. Testing: Installation of Paint Locker natural supply and natural exhaust louvers shall be tested in accordance with LCU-2K-97-5553-TEST.

12.0 INSTALLATION OF A/C AND EMERGENCY GENERATOR ROOM AUTOMATIC GRIP DOOR HOLDER ASSEMBLY.

12.1. Technical Data:

12.1.1. Drawing LCU-2000-5553-2, titled: US Army LCU-2000 FM-200 System Misc. Mods.

12.1.2. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

12.1.3. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

12.1.4. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

12.2. General Requirements:

12.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

12.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

12.3. Removals: None.

12.4. Installation: (Refer to Drawing LCU-2000-5553-2).

12.4.1. Fabricate the automatic grip door holder backing plate.

12.4.2. Fabricate the automatic grip door holder backing plate assembly. Field fit length of backing plate angle.

12.4.3. Install automatic grip door holder backing plate assembly on Shore Power Transformer Foundation (in A/C and Emergency Generator Room).

12.4.4. With automatic grip door holder backing plate assembly in place, template location and install automatic grip door holder strike plate on A/C and Emergency Generator Room door.

12.4.5. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

12.5. Testing: Installation of A/C and Emergency Generator Room Automatic Grip Door Holder Assembly shall be tested in accordance with LCU-2K-97-5553-TEST.

13.0 INSTALLATION OF TUNNEL VENT COVERS.

13.1. Technical Data:

13.1.1. Drawing LCU-2000-5553-2, titled: U.S. Army LCU-2000 FM-200 System Miscellaneous Mods.

13.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

13.1.3. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

13.1.4. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

13.1.5. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

13.2. General Requirements:

13.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

13.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

13.3. Removals: None.

13.4. Installation: (Refer to Drawing LCU-2000-5553-2).

13.4.1. Fabricate hold down bracket assemblies (qty 2).

13.4.2. Fabricate the hold back assemblies (qty 2).

13.4.3. Fabricate the vent cover assemblies (qty 2).

13.4.4. Installation of Tunnel Vent Cover (WTRTT BHD 25, Port side).

13.4.4.1. Install (qty 1) Tunnel Vent Cover (WTRTT BHD 25, Port side). Field fit length of hinge bracket.

13.4.4.2. With Tunnel Vent Cover in closed position, template location for and install (qty 1) hold down bracket assembly.

13.4.4.3. With Tunnel Vent Cover in open position, template location for and install (qty 1) hold back assembly. Field fit length of chain.

13.4.5. Installation of Tunnel Vent Cover (WTRTT BHD 17, Stbd side).

13.4.5.1. Install (qty 1) Tunnel Vent Cover (WTRTT BHD 17, Stbd side). Field fit length of hinge bracket.

13.4.5.2. With Tunnel Vent Cover in closed position, template location for and install (qty 1) hold down bracket assembly.

13.4.5.3. With Tunnel Vent Cover in open position, template location for and install (qty 1) hold back assembly.

13.4.5.4. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

13.4.7. Install the label plates in accordance with Drawing LCU-2000-5553-4.

13.5. Testing: Installation of Tunnel Vent Covers shall be tested in accordance with LCU-2K-97-5553-TEST.

14.0 INSTALLATION OF TUNNEL VENT CLOSURE HAND WHEEL.

14.1. Technical Data:

14.1.1. Drawing LCU-2000-5553-2, titled: U.S. Army LCU-2000 FM-200 System Miscellaneous Mods.

14.1.2. Drawing LCU-2000-5553-4, titled: U.S. Army LCU-2000 FM-200 System Label Plates and Placards.

14.1.3. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

14.1.4. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

14.2. General Requirements:

14.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

14.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

14.3. Removals:

14.3.1. Remove and retain Tunnel Vent Closure gear operated shaft assembly. New Tunnel Vent Closure Wheel shall be installed on shaft.

14.4. Installation: (Refer to Drawing LCU-2000-5553-2).

14.4.1. Template location of mounting hole in shaft from wheel and drill a 1/4" dia hole.

14.4.2. Install Tunnel Vent Closure Wheel on removed gear operated shaft, secure in place with spring pin.

14.4.3. Re-install Tunnel Vent Closure gear operated shaft assembly.

14.4.4. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144. Hand wheel shall be painted red.

14.4.5. Install the label plates in accordance with Drawing LCU-2000-5553-4.

14.5. Testing: Installation of Tunnel Vent Closure shall be tested in accordance with LCU-2K-97-5553-TEST.

15.0 ELECTRICAL SYSTEM MODIFICATIONS.

15.1. Technical Data:

15.1.1. Drawing LCU-2000-5553-3, titled: US Army LCU-2000 FM-200 System Electrical Modifications.

15.1.2. Drawing LCU-2000-5553-4, titled: US Army LCU-2000 FM-200 System Label Plates and Placards.

15.1.3. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

15.1.4. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

15.1.5. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

15.2. General Requirements:

15.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

15.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

15.2.3. Existing insulation, joiner work, or ceiling tiles disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

15.3. Removals: None.

15.4. Installation: (Refer to Drawing LCU-2000-5553-3 and Drawing LCU-2000-5553-4).

NOTES

1. Before reuse of all existing automatic shutdown wires from pressure switches to automatic equipment shutdown devices located in the protected spaces, wires shall have megger tests conducted and recorded to ensure safe condition, prior to reuse.
2. All existing terminal numbers, wire color codes, and wire connections shall be field verified as they may differ from the as-built drawings.
3. All butt splices shall be made using a one cycle crimping tool and insulated butt splices.
4. All wire screw terminations shall be made using insulated ring tongue terminal lugs. Wires shall be labeled with terminal lug number at termination.

15.4.1. Install and wire the following: terminal block (qty 1), marker strip (qty 1), relay (qty 1), contactor (qty 1), socket (qty 1), fuse holder (qty 1), fuse (qty 2), straddle plate (qty 2), standoff (qty 2) and hold down spring (qty 1) inside P211-2 Tunnel Supply Fan Controller. Component designations shall be marked on the chassis with black ink or black decals. Protective coating shall be applied to the designations.

15.4.2. Disconnect existing electrical cable EP024-10 (associated with Engine Room 24VDC Panel) from Bow Thruster Interface Module No. 1 in Bow Thruster Room. Pull cable back to Tunnel, cut to appropriate length and reconnect to Pressure Switch PS-7 located in the Tunnel. Cable penetrations shall be made using Cable Penetration List disclosed on Drawing LCU-2000-5553-3. Identify and tag reconnected cable, with embossed cable tag, as close as practicable to the pressure switch.

15.4.3. Install Junction Box FM2-FD7 in Tunnel on port side of WTRTT BHD 17. Cut existing electrical cable EP104-B(1) in Tunnel and connect to Junction Box FM2-FD7. Electrical cable connecting Junction Box FM2-FD7 to existing Junction Box FM2-FD2 in Bow Thruster Room shall be re-tagged as cable EP104-B(5).

15.4.4. Install Junction Box FM2-FD6 in the Engine Room along Longitudinal BHD, 7'-0" off CL, on starboard side. Cut existing electrical cable EP104-B(1) in Engine Room and connect to Junction Box FM2-FD6. Electrical cable connecting Junction Box FM2-FD6 to existing Junction Box FM2-FD4 in A/C and Emergency Generator Room shall remain tagged as cable EP104-B(1).

15.4.5. Remaining portion of former cable EP104-B(1) between Engine Room and Tunnel shall be removed and discarded.

15.4.6. Install the following components in locations indicated:

Circuit Component	Location
Engine Room Warning Bell.	Exterior Main Deck, BHD 28, CL
Engine Room Port Warning Light (Amber Strobe).	Engine Room, FR 33, port side, overhead.
Engine Room Stbd Warning Light (Amber Strobe).	Engine Room, FR 35, starboard side, overhead.
Machine Shop Warning Light (Amber Strobe).	Machine Shop, overhead.
Storeroom Warning Light (Amber Strobe).	Storeroom, overhead.
Engine Room Electric Horn/Strobe (fwd).	Control Room, fwd BHD, Stbd side.
Engine Room Electric Horn/Strobe (aft).	Control Room, aft BHD, Port side.
Paint Locker Warning Bell.	Exterior Main Deck, BHD 13, port side, above Paint Locker WTRTT door.
Bow Thruster Room Strobe Light.	Bow Thruster Room, WTRTT BHD 5.
Bow Thruster Room Warning Bell.	Exterior Main Deck, BHD 13, starboard side, above Bow Thruster Room WTRTT door.
Bow Thruster Room Electric Horn/Strobe.	Bow Thruster Room, WTRTT BHD 17, Port side.
Tunnel Warning Light (Amber Strobe).	Tunnel FR 21, CL.
Tunnel Warning Bell.	Exterior Main Deck, BHD 13, starboard side.
Tunnel Electric Horn/Strobe.	Tunnel, WTRTT BHD 25, Port side.
A/C and Emer. Gen. Room Warning Light (Amber Strobe).	A/C and Emer. Gen. Room, FR 47, overhead.
A/C and Emer. Gen. Room Warning Bell.	Exterior Main Deck, Aft BHD of Deckhouse, starboard side, above A/C and Emer. Gen. Room WTRTT door.
A/C and Emer. Gen. Room Electric Horn/Strobe.	A/C and Emer. Gen. Room, BHD 42 1/2.

15.4.7. Install the following new electrical cables:

Electrical Cable	From Circuit Component	To Circuit Component
EP104-A(1)	Press Switch PS-1.	Existing Junction Box FM2-FD4.
EP104-A(2)	Press Switch PS-1.	Existing Junction Box FM2-FD3.
EP104-A(4)	Existing Junction Box FM2-FD5.	Engine Room Port Warning Light.
EP104-A(5)	Existing Junction Box FM2-FD5.	Machine Shop Warning Light.
EP104-A(6)	Existing Junction Box FM2-FD5.	Storeroom Warning Light.
EP104-A(7)	Existing Junction Box FM2-FD5.	Engine Room Stbd. Warning Light.
EP104-A(8)	Eng Rm Stbd Warning Light.	Engine Room Warning Bell.
EP104-B(2)	Press Switch PS-8.	Existing Junction Box FM2-FD2.
EP104-B(3)	Existing Junction Box FM2-FD2.	Paint Locker Warning Bell.
EP104-B(4)	Junction Box FM2-FD6.	Junction Box FM2-FD7.
EP104-C	Junction Box FM2-FD7.	Press Switch PS-6.
EP104-C(1)	Press Switch PS-6.	Bow Thruster Rm. Warning Light.
EP104-C(2)	Bow Thruster Rm Warning Light.	Bow Thruster Room Warning Bell.
EP104-D	Junction Box FM2-FD6.	Press Switch PS-5.
EP104-D(1)	Press Switch PS-5.	Tunnel Warning Light.
EP104-D(2)	Press Switch PS-5.	P211-2 Tunnel Supply Fan Controller (SF-3).
EP104-D(3)	P211-2 Tunnel Supply Fan Controller (SF-3).	Tunnel Warning Bell.
EP104-E	Existing Junction Box FM2-FD4.	Press Switch PS-4.
EP104-E(1)	Press Switch PS-4.	A/C and Emer. Gen Rm. Warning Light.
EP104-E(2)	A/C and Emer. Gen. Room Warning Light.	A/C and Emer. Gen Rm. Warning Bell.
EP024-FM2	Press Switch PS-7.	Bow Thruster Gage Panel.
EP024-15A(PS)	Press Switch PS-1.	Existing Junction Box FM2-FD3B.
EP024-15B(PS)	Press Switch PS-2.	Existing Junction Box FM2-FD3B.
EP024-15C(PS)	Press Switch PS-1A.	Existing Junction Box FM2-FD3B.
EP024-15D(PS)	Emer. Gen. Battery Charger.	Press Switch PS-1A.
EP024-15E(PS)	Engine Room DC Panel.	Eng Rm Electric Horn/Strobe (aft).
EP024-15F(PS)	Eng Rm Electric Horn/Strobe (aft).	Eng Rm Electric Horn/Strobe (fwd).
EP024-10(1)	Press Switch PS-7.	Bow Thruster Interface Module No. 1.
EP024E(3)	Press Switch PS-3.	Emer. Gen. Set.
EP024E(1A)	Press Switch PS-3.	SSDG No. 1 Battery Charger.
EP024E(1B)	Press Switch PS-3.	A/C and Emer. Gen. Rm. Electric Horn/Strobe.

Electrical Cable	From Circuit Component	To Circuit Component
EP024(3A)	Engine Room DC Panel.	Press Switch PS-5.
EP024(3B)	Engine Room DC Panel.	Press Switch PS-7.
EP024(3C)	Tunnel Electric Horn/Strobe.	Press Switch PS-5.
EP024(3D)	Bow Thruster Room Electric Horn/Strobe.	Press Switch PS-7.
P111-3(PS)	Press Switch PS-6.	P211-3 Bow Thruster Supply Fan Controller (SF-4).
P111-10(PS)	Press Switch PS-4.	P211-10 A/C and Emer. Gen. Rm. Supply Fan Controller (SF-5).

Electrical cable should be routed using existing cable transits and wireways to the maximum extent possible and secured at a maximum spacing of 24 inches. Cable penetrations shall be made using Cable Penetration List disclosed on Drawing LCU-2000-5553-3. Identify and tag all new electrical cables, with embossed cable tags, as close as practicable to each point of connection, and on both sides of deck and bulkhead penetrations.

NOTE

Electrical penetrations into the Paint Locker (Qty 2) shall be made using explosion proof fittings.

15.4.8. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144.

15.4.9. Install label plates associated with electrical modifications in accordance with Drawing LCU-2000-5553-4.

15.5. Testing: Electrical System Modifications shall be tested in accordance with LCU-2K-97-5553-TEST.

16.0 INSTALLATION OF ENGINE ROOM WATER WASHDOWN SYSTEM (WWS).

16.1. Technical Data:

16.1.1. Drawing LCU-2000-5231-1, titled: U.S. Army LCU-2000 Water Washdown System Piping Installation and Details.

16.1.2. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

16.1.3. Drawing LCU-2000-5231-2, titled: US Army LCU-2000 Water Washdown System Label Plates and Placards.

16.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

16.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

16.1.6. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

16.2. General Requirements:

16.2.1. Coordinate completion of this item with Item 4.0 and 5.0.

16.2.2. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

16.2.3. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

16.2.4. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

16.3. Removals: None.

16.4. Installation: (Refer to Drawing LCU-2000-5231-1 and Drawing LCU-2000-5231-2).

16.4.1. Provide 9 1/4 inch wide x 25 1/2 inch tall cutout in inboard bulkhead of Passageway on Main Deck between FR 40 and FR 41.

16.4.2. Fabricate and install Engine Room WWS Control Station Box.

16.4.3. Install new branch tap in existing 4 inch NPS Fire Main piping in Engine Room Uptake and install Engine Room WWS piping between new branch tap and Engine Room WWS control valve. Take note to use same material as fire main material up to the transition flange at the WWS ball valve, and use of monel bolts at this transition flange.

16.4.4. Install Engine Room WWS piping including control valve, strainer and strainer blow-off valve for the Engine Room WWS Control Station Box.

16.4.5. Install Engine Room WWS piping from outlet of strainer in Engine Room WWS Control Station Box to nozzles located in Engine Room, Machine Shop, and Storeroom.

16.4.6. Engine Room WWS piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5231-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

16.4.7. Prior to performing functional testing, system piping installation, including all welding, shall be complete. Pneumatic Testing or Hydrostatic Testing, as described below, shall be performed.

Pneumatic Testing: Upon installation, Engine Room WWS piping shall be cleaned, blown out, and subjected to a Pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.

Hydrostatic Testing: Upon installation, Engine Room WWS piping shall be cleaned, blown out, and subjected to a Hydrostatic leak test in accordance with 46 CFR 56.97-30. Test medium shall be fresh water. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure. Ensure piping is dried using compressed air after this test.

16.4.8. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144. Paint WWS station piping red.

16.4.9. Install label plates and Engine Room WWS placard in accordance with Drawing LCU-2000-5231-2.

16.5. Testing: Engine Room WWS Installation shall be tested in accordance with LCU-2K-97-5553-TEST.

17.0 INSTALLATION OF TUNNEL WATER WASHDOWN SYSTEM (WWS).

17.1. Technical Data:

17.1.1. Drawing LCU-2000-5231-1, titled: U.S. Army LCU-2000 Water Washdown System Piping Installation and Details.

17.1.2. Drawing LCU-2000-5553-1, titled: U.S. Army LCU-2000 FM-200 System Piping Installation and Details.

17.1.3. Drawing LCU-2000-5231-2, titled: U.S. Army LCU-2000 Water Washdown System Label Plates and Placards.

17.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

17.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

17.1.6. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

17.2. General Requirements:

17.2.1. Coordinate completion of this item with Item 5.0, 6.0, and 7.0.

17.2.2. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

17.2.3. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

17.2.4. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

17.3. Removals/Relocations:

17.3.1. Remove existing WTRTT closure label plate and BHD 25 identification label plate, located on Engine Room side of BHD 25. Retain both label plates for relocation.

17.3.2. Disconnect and remove existing electrical cable between Tunnel General Alarm Bell, located on Tunnel side of BHD 25, and existing Tunnel General Alarm Junction Box DB-J1. Retain existing stuffing tubes and cable tags for reuse.

17.3.3. Remove existing Tunnel General Alarm Bell and associated label plates (qty 2), located on Tunnel side of BHD 25. Retain bell and label plates for reuse.

17.4. Installation: (Refer to Drawing LCU-2000-5231-1 and Drawing LCU-2000-5231-2).

17.4.1. Provide 20 5/8 inch wide x 16 inch tall cutout on Engine Room side of BHD 25 inboard of Tunnel WTRTT door.

17.4.2. Fabricate and install Tunnel WWS Control Station Box.

17.4.3. Install new branch tap in existing 4 NPS Fire Main piping in Tunnel install Tunnel WWS piping between new branch tap and Tunnel WWS control valve. Take note to use same material as fire main material up to the transition flange at the WWS ball valve, and use of monel bolts at this transition flange.

17.4.4. Install the Tunnel WWS piping including control valve, strainer and strainer blow-off valve of Tunnel WWS Control Station Box.

17.4.5. Install the Tunnel WWS piping from outlet of strainer in Tunnel WWS Control Station Box to nozzles located in Tunnel.

17.4.6. Tunnel WWS piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5231-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

17.4.7. Prior to performing functional testing, system piping installation, including all welding, shall be complete. Pneumatic Testing or Hydrostatic Testing, as described below, may be performed.

Pneumatic Testing: Upon installation, Tunnel WWS piping shall be cleaned, blown out, and subjected to a Pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.

Hydrostatic Testing: Upon installation, Tunnel WWS piping shall be cleaned, blown out, and subjected to a Hydrostatic leak test in accordance with 46 CFR 56.97-30. Test medium shall be fresh water. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure. Dry piping using compressed air after this test.

17.4.8. Reinstall WTRTT closure label plate and BHD 25 identification label plate (retained for relocation) at suitable location on Engine Room side of BHD 25.

17.4.9. Reinstall Tunnel General Alarm Bell and associated label plates (retained for relocation) on Tunnel side of Tunnel WWS Control Station back plate.

17.4.10. Install new electrical cable between relocated Tunnel General Alarm Bell and existing Tunnel General Alarm Junction Box DB-G1 using existing stuffing tubes and cable tags (retained for reuse).

17.4.11. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144. Paint WWS station piping red.

17.4.12. Install label plates and Tunnel WWS placard in accordance with Drawing LCU-2000-5231-2.

17.5. Testing: Tunnel WWS Installation shall be tested in accordance with LCU-2K-97-5553-TEST.

18.0 INSTALLATION OF BOW THRUSTER ROOM WATER WASHDOWN SYSTEM (WWS).

18.1. Technical Data:

18.1.1. Drawing LCU-2000-5231-1, titled: US Army LCU-2000 Water Washdown System Piping Installation and Details.

18.1.2. Drawing LCU-2000-5553-1, titled: US Army LCU-2000 FM-200 System Piping Installation and Details.

18.1.3. Drawing LCU-2000-5231-2, titled: US Army LCU-2000 Water Washdown System Label Plates and Placards.

18.1.4. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

18.1.5. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

18.1.6. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

18.2. General Requirements:

18.2.1. Coordinate completion of this item with Items 6.0 and 7.0.

18.2.2. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

18.2.3. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

18.2.4. Existing insulation disturbed or damaged by this modification shall be repaired or renewed to a like new condition.

18.3. Removals: None.

18.4. Installation: (Refer to Drawing LCU-2000-5231-1 and Drawing LCU-2000-5231-2).

18.4.1. Install new branch tap in existing 3 NPS Fire Main piping in Tunnel and install Bow Thruster Room WWS piping between new branch tap and Tunnel side of bulkhead penetration through BHD 17. Including control valve, strainer, strainer blow-off valve, and low point drain of Bow Thruster Room WWS Control Station in Tunnel. Take note to use same material as fire main material up to the transition flange at the WWS ball valve, and use of monel bolts at this transition flange.

18.4.2. Install Bow Thruster Room WWS piping from Bow Thruster side of bulkhead penetration through BHD 17 to nozzles located in Bow Thruster Room.

18.4.3. Bow Thruster Room WWS piping shall be adequately supported to prevent vibration and protect against damage using pipe hangers disclosed on Drawing LCU-2000-5231-1. Location of pipe hangers shall be determined based on actual conditions found aboard the vessel.

18.4.4. Prior to performing functional testing, system piping installation, including all welding, shall be complete. Pneumatic Testing or Hydrostatic Testing, as described below, may be performed.

Pneumatic Testing: Upon installation, Bow Thruster Room WWS piping shall be cleaned, blown out, and subjected to a Pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure.

Hydrostatic Testing: Upon installation, Bow Thruster Room WWS piping shall be cleaned, blown out, and subjected to a Hydrostatic leak test in accordance with 46 CFR 56.97-30. Test medium shall be fresh water. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a period of ten (10) minutes, the pressure drop shall not exceed five (5) percent of the test pressure. Dry piping using compressed air after this test.

18.4.5. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144. Paint WWS station piping red.

18.4.6. Install label plates and Bow Thruster Room WWS placard in accordance with Drawing LCU-2000-5231-2.

18.5. Testing: Bow Thruster Room WWS Installation shall be tested in accordance with LCU-2K-97-5553-TEST.

19.0 INSTALLATION OF A/C AND EMERGENCY GENERATOR ROOM AUTOMATIC FIRE DAMPERS.

19.1. Technical Data:

19.1.1. Drawing LCU-2000-5553-2, titled: US Army LCU-2000 FM-200 System Misc. Mods.

19.1.2. Technical Bulletin TB 43-0144, titled: Painting of Watercraft.

19.1.3. Technical Bulletin TB 55-1900-204-24, titled: Arc Welding on Water-borne Vessels.

19.1.4. LCU-2K-97-5553-TEST, titled: Functional Test Plan for Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard the US Army Landing Craft Utility, 2000 Class (LCU-2000).

19.2. General Requirements:

19.2.1. Furnish all necessary material, labor, equipment, supplies, power, accessories, facilities, and other items and services that are necessary for accomplishing the work specified in this item including removal and reinstallation of all interferences. Work can be combined or arranged in any sequence that will be the most practical and efficient for completing the effort.

19.2.2. Rigid control of welding and grounding shall be maintained to protect the hull and machinery. Care shall be taken to ensure that the polarity and ground connections of welding machines do not damage the vessel. While the vessel is waterborne, no arc welding shall be permitted until the Contractor has provided stray current protection by connecting welding leads in accordance with TB 55-1900-204-24.

19.3. Removals: Remove existing natural air intake and powered emergency diesel generator cover assemblies. Remove existing bolted stationary louvers associated with these damper openings. Remove any other necessary interferences to provide clear openings of these damper openings. Retain covers and stationary bolted on louvers for reinstallations.

19.4. Installation: (Refer to Drawing LCU-2000-5553-2).

19.4.1. Fabricate and install (quantity of 2) new steel frames for the natural vent and diesel engine vent per the drawing dimensions (suit to fit existing as-built conditions). Fabrications may require slight alterations to dimensions to fit each individual watercraft vent opening. Refer to drawings for installation specifics and rough dimensions.

19.4.2 Fabricate and install a sheet metal rectangular duct to attach the fire damper to the downstream side of the existing powered heater. Mount automatic damper assembly onto end of ductwork using sheet metal screws to mount. Fabricate and install (weld) circular plate to enclose existing opening on underside to intake side of ductwork. Install fire proof insulation wrap over complete duct assembly.

19.4.3 Install the new automatic fire dampers by bolting in place. Note that the three (3) dampers open inwards to the space and have a handle mounted on the side to connect the chain for the automatic actuation by the CO2 gas via the pressure trips. Also note that the diesel engine damper is the heavier grade galvanized steel construction rated for more severe duty.

19.4.4. Install the CO2 ½” galvanized steel actuation piping and associated hangers from the CO2 actuation cylinder T located in the storage space and fitting up to each pressure trip device (qty of 3). Install pressure trips and the spring loaded pressure trip wires along with the factory installed fusible links.

19.4.5 Re-install the stationary louvers to the new outside flanges of the frames and template bolt holes to fit. Install new gasket seals and use new stainless steel machine screws, recess heads to be provide for flush mounting of outside covers. Install new ½” 316 s.s mounting hardware for the covers. Straighten and stiffen cover plates by welding two (2) parallel aluminum angle brackets to outside of covers.

19.4.6. Newly installed material, equipment, and disturbed areas shall be cleaned, painted, and marked in accordance with TB 43-0144 (primer and 2 top coats).

19.5. Testing: Installation of A/C and Emergency Generator Room Automatic Fire Dampers shall be tested in accordance with LCU-2K-97-5553-TEST.

#

ATTACHMENT 3

HEALTH AND SAFETY PLAN (HASP) (Rev. 2)

FOR

REPLACEMENT OF HALON TOTAL FLOODING FIRE EXTINGUISHING SYSTEMS ONBOARD US ARMY WATERCRAFT (UNCLASSIFIED)

FEBRUARY 2000

ISSUED BY:

**DOT/RSPA
VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER
DTS-35, TECHNOLOGY APPLICATIONS AND DEPLOYMENT DIVISION
KENDALL SQUARE, 55 BROADWAY
CAMBRIDGE, MA 02142**

**DISTRIBUTION STATEMENT A.
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.**

TO REMAIN ON MESSDECK

TABLE OF CONTENTS

1.0	SPECIFICATIONS.....	1
2.0	APPROVAL	3
3.0	ADOPTION.....	4
4.0	SUMMARY.....	5
5.0	GENERAL.....	6
6.0	ORGANIZATION AND RESPONSIBILITIES	7
7.0	WORK PLAN	12
8.0	JOB HAZARD ANALYSIS	12
9.0	GENERAL HEALTH AND SAFETY PROGRAM	17
10.0	PERSONAL PROTECTION AND SAFETY	22
11.0	STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, WORK PRACTICES, PROCESS SAFETY MANAGEMENT	26
12.0	EMERGENCY RESPONSE AND CONTINGENCY	40
13.0	POLLUTION	42
14.0	LOGS, REPORTS, AND RECORD KEEPING	43

SPECIFICATIONS

Program: Replacement of Halon Total Flooding Fire Extinguishing Systems
Onboard U.S. Army Watercraft

Contract Number: DTRS-01-C-10057

Contracting Agency: USDOT/Volpe National Transportation Systems Center (Volpe Center).

Points of Contact:

Contracting Officer (CO)

Name: Kathy Regan
Agency: Volpe Center
Address: 55 Broadway Cambridge,
MA 02142
Tel.: 617-494-3485
Fax.: 617-494-3024

Project Manager/COTR

Name: Mark Gentile
Mario Caputo
Agency: Volpe Center
Address: 55 Broadway
Cambridge, MA 02142
Tel.: 617-494-2233/2899
Fax.: 617-494-3066
Cell Phone 617-470-
8795/8797

Site Support

Name: Bob Pray
Julie Devine
Agency: Volpe Center
Address: 55 Broadway
Cambridge, MA 02142
Tel.: 617-494-2023 (B. Pray)
Tel.: 617-494-3127 (J. Devine)
Cell:

Contractor: Name
 Address

Contractor Points of Contact:

**Production Co-ordinator/
Manager**

Name:
Tel.:
Cell:
Home:

**On Site Superintendent/
HASP/QA Manager**

Name:
Cell:

Lead Technician

Name:
Cell:

2.0 APPROVALS

2.1 Volpe Center:

This Health and Safety Plan (HASP) is applicable to the Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard US Army Watercraft at each designated location. This HASP has been reviewed for conformance to the requirements identified in the Statement Of Work (SOW), Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard U.S. Army Watercraft and is hereby accepted and approved.

_____	_____
Program Manager	Date
_____	_____
COTR	Date

3.0 ADOPTION

This Health and Safety Plan (HASP) for the Replacement of Halon Total Flooding Fire Extinguishing Systems Onboard U.S. Army Watercraft at each designated location has been reviewed, accepted and adopted by the Contracted Agency. ***The Contractor agrees*** to implement this plan, including any and all accepted additions, deletions and revisions, for all phases of field work specified for this project. This HASP is a living document, subject to revision and updating as special circumstance and detail becomes available. The requirements of this plan shall apply to the Contracted Agency, including any subcontractors, and other personnel entering and/or performing work in regulated areas as specified by this plan.

This HASP has been reviewed, approved and adopted by the ***Contractor***.

Name:

Title:

Company:

Date:

4.0 SUMMARY

4.1 Introduction

This HASP is applicable as a guidance and requirements document over the life of the contract. The HASP provides the following:

- The HASP provides basic guidelines for design/re-design of systems within the parameters of Safety and Health, including Human Factors Engineering criteria. The HASP also establishes guidelines for the performance of shipchecks and the identification of unsafe and/or potentially hazardous conditions.
- The HASP identifies parameters for safe installation of system componentry and aids in the determination of special equipment needs.
- The HASP contributes guidelines and procedures for the safe conduct of installation of systems in each of the four classes of U.S. Army Watercraft. The HASP identifies areas of concern to be included within the Training Plan for watercraft personnel.
- The HASP contributes guidelines and procedures for the safe conduct of Functional Testing of systems in each of the four classes of U.S. Army Watercraft. The HASP establishes training parameters and guidelines, highlighting conditions and situation that contribute to unsafe or unhealthy conditions.

4.2 Site Conditions

The installation of the FM-200 Total Flooding Fire Extinguishing and Water Washdown Systems will be accomplished at the home ports of the watercraft unless otherwise directed. The working conditions will be those associated with dockside conditions at:

Ft. Eustis, VA
Baltimore, MD
Tacoma, WA
Honolulu, HI
Moorehead City, NC

Hythe, U.K.
Panama
Mare Island, CA
Kwajalean, M.I.

The work sites are considered non-hazardous, but will be given special consideration due to the types of processes required during installation. Fire watches will be set during those times where welding and open flame are used. The buddy system will be implemented during performance of work within confined spaces.

4.3 Characterization of Possible Site Contaminants

Chemical contaminants which may present a potential occupational and environmental health hazard if not removed from the work areas and properly stored during the performance of work include the following:

Diesel Oil and Gasoline
Enamel, Alkyd, and Latex Paints
Paint Thinners and Removers

Starting Fluids and Ethers
Petroleum Based Lubricants
Hydraulic Fluids

4.4 Hazards

Hazards directly associated with the replacement of the Halon Fire extinguishing systems with FM-200 Total Flooding Fire Extinguishing and Water Washdown Systems are those associated with the handling, removal and installation of compressed gas cylinders and those associated with performing “hot work”, otherwise known as gas/oxygen and arc welding. Extreme care and caution is exercised when performing “hot work” because of the increased hazards associated with maintaining charged cylinders of oxygen and acetylene on site.

5.0 GENERAL

5.1 Scope

All work shall be performed in compliance with:

- Title 29 of the Code of Federal Regulations, Parts 1900-1999; Occupational Safety and Health Administration, Department of Labor.
- Title 29 of the Code of Federal Regulations; Part 1915, Safe for Men and Safe for Hot Work (Gas Free) Certification,
- Title 46 of the Code of Federal Regulation, Subchapter F (Marine Engineering, Subparts 50, 56, 57, and 61).
- Title 49 of the Code of Federal Regulations 171 through 177; Hazardous Materials Regulations;
- FED-STD-313; Material Safety Data, Transportation Data, and Disposal Data for Hazardous Materials Furnished to Government Activities;
- Compressed Gas Association (CGA) Pamphlets P-1, C-1, and C-6, titled; FM-200 Cylinder Testing and Inspections;

5.2 Purpose

This HASP has the following designated purposes:

- To delineate designated personnel roles and responsibilities related to project safety;
- To describe known and anticipated hazards and requisite hazard control measures;
- To establish injury and illness prevention procedures applicable to site operations;
- To establish chemical and medical emergency procedures in anticipation of reasonably foreseeable emergency incidents;
- To understandably communicate all hazard, safety and accident prevention information to assigned and visiting site personnel.

5.3 Application

The requirements established by this HASP are mandatory, and shall apply to all contractor employees, its subcontractors and any other personnel entering regulated work areas during active site operations. The contractor shall be responsible for training all of its employees and subcontractors regarding the information and contents of this HASP prior to the commencement of work. In addition, the contractor shall provide a copy of this plan to any authorized personnel who must enter regulated work areas. This HASP is a living document, subject to change and revision as

special circumstance and requirements are identified. As such, the HASP will be updated as necessary to include newly identified, or changed, emergency numbers, site maps, and procedures identified to improve upon the health and safety of all personnel. Finally, the contractor shall maintain a current copy of this HASP, available for inspection, at the work site during each day of field operations.

5.4 Revisions

Changes in the scope of work operations, and/or changing or unanticipated site conditions may require modification and subsequent approval of the modified HASP in order to maintain site safety in compliance with contract requirements and Occupational Safety and Health Administration (OSHA) regulations. Any and all changes to the HASP shall be prepared and/or reviewed by the Health And Safety Team (HASP) Manager and submitted to the Contracting Officer Technical Representative (COTR) for approval. Work operations affected by such revisions shall not proceed unless specifically authorized by the HASP Manager and the COTR. Only the COTR may authorize operations to continue while changes to the HASP are under review by the Volpe Center.

ORGANIZATION AND RESPONSIBILITIES

6.1 Organization

6.1.1 Installation Team

The Installation Team consists of the following leaders:

HASP Manager

Site Supervisor

6.1.2 Kidde-Fenwal Inc.

Kidde-Fenwal Inc. (Kidde) is the equipment manufacturer of the FM-200 system components. By letter dated 5 January 1995, Underwriters Laboratories (UL) authorized the application of the UL mark to “Kidde ECS Series Engineered Clean Agent Extinguishing System Units Utilizing FM-200 Clean Agent.” The UL file reference is EX-4647, Project 94NK8217. In addition, Kidde systems received U.S. Coast Guard Certificate of Approval in May, 1998.

6.1.3 Great Lakes Chemical

Great Lakes Chemical is the manufacturer of the FM-200 Clean Agent.

6.2 Site Installation Team

Based on the scope of work and the project work plan (see Section 7.0) the site installation team shall consist of a Site Supervisor, who may also serve as the QC/Safety Officer. Because of the size of the site work team, a simple organizational structure is applicable.

6.2.1 Identification of Installation Team

The Installation Team will be responsible for performing the following on designated Army vessels in accordance with requirements identified in the SOW:

- Site inspections and shipchecks.
- Provide technical assistance in any re-design efforts.
- Removal of existing Halon 1301 fixed fire extinguishing systems.
- Turn-in of all Halon 1301 cylinders in accordance with instructions detailed herein.
- Performing required vessel modifications to support removals and installations.
- Installation of FM-200 total flooding fixed fire extinguishing systems.
- Installation of Water Washdown Systems (WWS).
- Perform testing in accordance with requirements identified in the SOW.
- Provide assistance with training.
- Providing one year warranty, parts and installation, each vessel.
- Provide three years manufacturer's recommended inspection and routine PM services and supplies, each vessel.
- Provide special tools and test equipment for system inspection and maintenance.
- Provide identified manufacturer recommended spare parts.

6.3 Health and Safety Team

6.3.1 Health and Safety Policy

The Health and Safety Plan (HASP) Manager, hereafter referred to as the HASP Manager, subscribes to a Total Safety Focus (TSF) in his/her everyday work plan. This focus works towards analyzing each work requirement, providing each worker with a detailed explanation of the work requirement, stressing the importance of TSF to all employees.

The TSF follows these principles:

- All installations will be analyzed for health and safety hazards during the Site Review and Shipcheck to be conducted prior to each installation.
- In the event the Site Review/Shipcheck analysis identifies a unique health or safety hazard, specific health and safety procedures will be developed to eliminate or minimize the hazard.
- The HASP policy is to be pro-active by performing proper work analysis and planning rather than being reactive to unique circumstances.
- Anyone who neglects health and safety, whether or not an incident or accident occurs, is guilty of a serious offense in our incident and accident prevention plans. Such an employee is subject to termination.
- No work is so important and no service is so urgent that time cannot be taken to perform the work safely.

6.3.2 Designation of the HASP Manager

The HASP Manager is a responsible and experienced person from the Contractor Team. The Manager contributes expertise to the resulting surveillance activities conducted and to the procedures contributed and executed during installation.

The Production, Quality Assurance, and Safety Manager, may be designated as the HASP Manager during the inspection, installation, testing, training, warranty, and servicing phases of the Halon Replacement Contract.

6.4 Responsibilities

6.4.1 HASP Manager

The HASP Manager is responsible for overall management of Health and Safety throughout the Halon Replacement Contract. The HASP Manager shall be responsible for the following:

- Coordination of all work performed by the contractor for the project by serving as the point of contact (POC) between the Volpe Center and the contractor for all contract matters pertaining to Health and Safety;
- Serving as the liaison with the contracting agency and all other designated federal, state, and local agencies by ensuring verification that all required federal, state, local, and organizational certifications and/or permits have been obtained and are current, including those necessary to transport or ship compressed gas cylinders, and providing the Harbormaster and COTR with copies of all certifications, permits and licenses;
- Ensuring that the Health and Safety Plan (HASP) is approved by the contracting agency prior to commencement of operations;
- Ensuring that all employees and subcontractors assigned to the project have been informed of, and trained in the content of the HASP;
- Ensuring that required personal protective equipment, air monitoring instruments and other safety related items are provided and properly utilized during the program;
- Ensuring that all personnel assigned to the project have been instructed on the work plan, operations to be performed, known and potential hazards associated with the work, HASP requirements, proper use of required personal protective equipment, specified safe work practices, proper action in the event of a medical or chemical emergencies, and related site specific safety information;
- Monitoring overall safety performance of field personnel;
- Ensuring the correction of proposed, or existing, work practices and/or conditions that may result in injury and/or exposure to hazards;
- Ensuring immediate suspension of Contractor operations in the event of an emergency or serious hazard, in order to protect personnel and/or the environment;
- Ensuring the prompt preparation and submittal of required Work Progress/Accident Reports and Air Monitoring Reports as part of the monthly reporting process;
- Ensuring the timely submission and maintenance of all required Safety and Health Records including Incident Reports, Incident Report/Investigation Log, Incident Investigation Report, Accident Report, Accident Report/Investigation Log, Accident Investigation Report, HASP Compliance Agreements, Tailgate Safety Meeting Forms, Safety Inspection Reports, On-Site

Visitor Information Form and Log (See Appendices), and any other item of documentation mandated by the specific site safety authority and Harbormaster;

- Perform Health and Safety crew briefings and Tailgate Safety Meetings to verify all health and safety policies and requirements are disseminated to all members of the Installation Teams.
- Perform monitoring of inspections, installations, testing, and training to ensure all health and safety policies and requirements, as identified in Paragraph 5.1 (Scope) and herein, are fully adhered to by all site personnel;
- Ensure all incidents are fully documented on an Incident Report. Forward a copy of each Incident Report to the Harbormaster, Volpe Center COTR and Transportation Battalion Marine Safety Office (TBMSO) within four (4) working days. A copy of an Incident Report is provided at Appendix B;
- Ensure a record of all Incident Reports is maintained. This will be accomplished utilizing the Incident Report/Investigation Log. A copy of an Incident Report/Investigation Log is provided at Appendix C;
- Ensure all incidents are investigated and logged utilizing the Incident Investigation Report and the Incident Report/Investigation Log. Forward a copy of each Incident Investigation Report to the Harbormaster, COTR and TBMSO within four (4) working days. A copy of an Incident Investigation Report is provided at Appendix D;
- Ensure all reportable accidents are fully documented on an Accident Report. Forward a copy of each Accident Report to the Harbormaster, Volpe Center COTR and TBMSO within four (4) working days. A copy of an Accident Report is provided at Appendix E;
- Ensure a record of all Accident Reports is maintained. This will be accomplished utilizing the Accident Report/Investigation Log. A copy of an Accident Report/Investigation Log is provided at Appendix F;
- Ensure all accidents are investigated utilizing the Accident Investigation Report and are entered in the Accident Report/Investigation Log. Forward a copy of each Incident Investigation Report to the Harbormaster, COTR and TBMSO within four (4) working days. A copy of an Accident Investigation Report is provided at Appendix G;
- Provide notification of any and all unintentional discharges of compressed gas (CO₂, Halon 1301, and FM-200) to COTR. Ensure unintentional discharges of CO₂, Halon 1301, or FM-200 are documented utilizing an Incident Report and fully investigated utilizing an Incident Investigation Report;
- Verify and document all Halon 1301 removed from vessels has been turned into the Defense Depot located in Richmond, VA, in accordance with requirements identified herein. Provide verification of turn-in (copy of turn-in documents) to Volpe Center COTR.
- Ensure all welders and marine chemist are certified to SOW requirements.

Responsibility for Health and Safety during the site specific inspection, installation, testing, training, warranty, and servicing phases of the Halon Replacement Contract is delegated to the HASP Manager.

6.4.2 Certified Chemist/Industrial Hygienist (CC/IH):

A CC/IH shall serve as the contractors occupational health & safety consultant for air quality. The CC/IH shall provide the following support:

- Be responsible for assessment of air monitoring data and recommending changes to engineering controls, work practices, and (Personal Protective Equipment) PPE;
- Provide on-site consultation as needed to ensure the HASP is fully implemented;
- Coordinate any modifications with the HASP Manager;
- Provide continued support for upgrading/downgrading of the level of personal protection;

6.4.3 Site Personnel

All site personnel assigned to the project, including any subcontractor personnel, shall follow the requirements of the HASP, and shall be responsible for the following:

- At all times acting in a responsible and cautious manner in order to prevent accident, injury and/or exposure to themselves and their co-workers;
- Reporting any and all accidents, injuries, exposures and/or near misses to the HASP Manager;
- Attending and participating in all Tailgate Safety Meetings conducted during the project;
- Following the instructions and directions of the HASP Manager;
- Utilizing the PPE provided and specified for use;
- Following all site safety procedures for safe work practices, buddy system, communication, site control, evacuations and related emergency procedures;
- Performing only those tasks they have been instructed to perform and that they believe they are trained, qualified and capable at the time of assignment of performing;
- Reporting to the HASP Manager any personal condition that they reasonably believe could affect their safety and/or the safety of co-workers (i.e. fatigue, drowsiness, severe illness, impairment by prescription medications, influence by drugs and alcohol, emotional distress or other condition);
- Ensuring that no work tasks are performed in deviation from the HASP without the expressed authorization and additional instruction of the HASP Manager.

6.4.4 Site Visitors

Authorized Site Visitors, including contract agency and other federal, state and/or local agency personnel may visit the site as per the project specification, but shall be responsible for the following:

- Receiving site hazard and safety instructions from the Site Supervisor;
- Reviewing and complying with the essential elements of the HASP;
- Indicating understanding and receipt of the HASP information by signature on the On-Site Visitor Information Form and Log (see Appendix O);
- Providing and using their own PPE to enter regulated work areas when such controls are required for entry as per the HASP;
- Reporting any observed, or perceived, unsafe act and/or condition at, or affecting, the work site.

For the purpose of this HASP and the contract which it supports, Site Visitors are considered to comprise all personnel not directly associated with the performance of duties related to the physical demolition for, and installation of, the Halon Replacement System, supervision of those duties, and/or the crew of the vessel on which the work is being performed.

7.0 WORKPLAN

7.1 Refer to STATEMENT OF WORK

8.0 JOB HAZARD ANALYSIS

8.1 Chemical Hazards

The potential toxic exposure hazard to site personnel of Hazardous Chemicals and Substances is expressed in Threshold Limit Values-Time Weighted Averages (TLV-TWA) as established by the American Conference of Governmental Industrial Hygienists (ACGIH), Permissible Exposure Limits (PEL) as mandated by the Occupational Safety and Health Administration (OSHA), Recommended Exposure Limits (REL) and Short Term Exposure Limits (STEL) as suggested by the National Institute of Occupational Safety and Health (NIOSH), and by Immediately Dangerous to Life or Health (IDLH) values established by NIOSH and OSHA. These terms are defined as follows:

TLV-TWA - Airborne concentration of a substance to which nearly all workers (8 hours/day, 40 hours/week) may be repeatedly exposed, day after day, without experiencing adverse health effects. For some substances, the overall exposure to substance is intensified by being absorbed by the skin, mucous membranes or eyes, either by airborne, or particularly, by direct contact with the substance. Other substances have ceiling values which should not be exceeded during any part of the shift.

PEL - Established by federal or state OSHA. PELs may be expressed as an 8-hour Time Weighted Average (TWA) or as a ceiling limit. Ceiling limits may not be exceeded at any time during a work day. PELs are enforceable by law.

REL- Developed by NIOSH. RELs are published guidelines that recommend employee exposure limits for airborne contaminants. RELs are expressed as a TWA or ceiling limit.

IDLH - Defined as conditions that pose an immediate threat to life or health or conditions that pose an immediate threat or severe exposure to contaminants which are likely to have an adverse cumulative or delayed effect on health. Two factors are considered when establishing IDLH concentrations:

- The worker must be able to escape within 30 minutes without losing his or her life or suffering permanent health damage. Thirty minutes is considered by OSHA as the maximum permissible exposure time for escape; and
- The worker must be able to escape without severe eye or respiratory irritation or other reactions that could inhibit escape. If the concentration is above the IDLH levels, only highly reliable breathing apparatus, such as pressure-demand self contained breathing apparatus (SCBA), is allowed. Since IDLH limits are conservative, any approved respirator may be used up to this limit as long as its maximum use concentration, or the limitations on the air-purifying element are not exceeded.

STEL - STEL is defined as the concentration of a substance to which nearly all workers can be exposed to for 15 minutes, four times a day with at least 1 hour between exposure. Note: the overall exposure cannot exceed the TLV-TWA.

PELs may vary in comparison to the TLV-TWA levels (ACGIH) and RELs (NIOSH). All site activities shall comply with the exposure standards mandated by OSHA, or the ACGIH-TLV-TWA, whichever is more stringent.

8.2 Physical Hazards

8.2.1 Cold Stress Monitoring

Cold injury includes frostbite and hypothermia and can be caused by low temperatures and/or low wind chill factors. Warm shelter will be available at all times, warm clothing will be worn and work schedules will reflect the need to rest away from the cold temperatures. Warm drinks (no alcohol) shall also be introduced at sites where the ambient is less than 50°F for the period of work. The "buddy system" shall be implemented at all times while work is being conducted and exposure to low temperatures is experienced.

8.2.2 Heat Stress Monitoring

As such, heat stress is anticipated to be one of the most significant physical hazards associated with installations performed in the tropics. In addition, field personnel are expected to wear personal protective clothing and equipment for designated tasks, such as welding helmets, gloves and fire resistant clothing, which will aggravate the heat stress hazard.

The hazards of exposure to hot environments may cause a variety of illnesses including heat rash, muscle cramps, heat exhaustion and heat stroke. Onset of signs and symptoms of exposure can occur rapidly, and may progress to a medical emergency (i.e. heat stroke) without early intervention.

To control exposure to heat stress hazard, monitoring will commence when personnel are required to wear personal protective equipment, in ambient conditions exceeding 85°F.

Ambient conditions shall be determined by maintaining a properly calibrated outdoor thermometer at each work location, or by monitoring local weather reports throughout each work shift.

Heat stress exposure shall be evaluated by monitoring heart rate. The radial pulse shall be taken for 30 seconds immediately upon beginning to rest (i.e. at the beginning of a rest break). This rate shall be multiplied by two to determine the heart rate at initial rest. This rate should not exceed 110 beats per minute (bpm). Following three minutes of rest, the heart rate shall be taken again (same procedure). The difference between the initial and third minute heart rate should be greater than 10 bpm.

If the initial rate exceeds 110 bpm **OR** the difference between the initial and third minute rate is less than 10 bpm, then the work period shall be shortened by 33 percent and the rest period increased by 33 percent.

To control the exposure to heat stress during any site activity, the following safety procedures shall be implemented:

- All employees shall be monitored for heat stress;
- Potable drinking water shall be available at all times;

- A buddy system shall be utilized,
- Employees shall be encouraged to eat a normal diet;
- Employees shall be encouraged to refrain from consuming diuretics, including caffeine from coffee and tea beverages, or any form of alcohol. (Note: Consumption of alcohol is prohibited during work hours).

8.2.3 Noise Monitoring

The potential for noise exposure during field operations is related to individual equipment operations and any adjacent vehicle or vessel noise. The variables affecting actual noise exposure include proximity to other operations, operating conditions of equipment in use, proximity of operating equipment to field personnel and duration of equipment usage. Earplugs will be worn by workers when ambient noise levels exceed 75 dBA or when working in any space in which “HEARING PROTECTION REQUIRED” is posted and machinery is operating.

8.2.4 Safety Hazards - Vehicle Traffic

Employees may be exposed to vehicle accident hazards associated with the operation of vehicles during the project. To control these hazards, the following safety requirements will be strictly enforced.

- Seat belts shall be worn ANYTIME a vehicle is in motion, regardless of speed or distance to be traveled. Seat belt requirements also apply to the operation of any construction equipment equipped with seating;
- Base and off-base speed laws shall be followed at all times. Vehicles shall never be operated at a speed that is not safe for the conditions (i.e. road surface, traffic, visibility, weather, etc.).

8.2.5 Confined Space Entry

A confined space is defined as any location with:

- Limited means of entry and exit.
- Not designed for continuous occupancy.
- Capable of being physically entered by an individual.

8.2.5.1 Regulations

Federal safety regulations require that each employer generate and implement a written confined space entry program. Confined space entry programs shall at a minimum meet the requirements of the following regulations: Section 1910.146, Permit required Confined Space Entry, Fed-OSHA Code of Federal Regulations (CFR) 29. In addition, the HASP Manager will confer with local safety officials to insure compliance with, and inclusion of, their policies on confined space entry.

8.2.5.2 Hazards of a Confined Space

The two most potential hazards in a confined space are a lack of oxygen and a flammable atmosphere. Lack of oxygen is defined as less than 19.5% concentration/mix of oxygen within the space. Normal air has 21% oxygen. Flammable vapors in air must be controlled to less than 10% of their lower flammable limit (LFL).

8.2.5.3 Confined Space Entry Procedures

The following confined space entry procedures must be considered prior to entry.

- Lockout, blockout and/or tagout mechanical, electrical, and liquid gas systems.
- Test and document the atmosphere for oxygen level, flammable vapors and toxic vapors.
- No entry if less than 19.5% oxygen unless wearing an air-supplied respirator.
- No welding, cutting or processes that generate sparks if LEL is above zero on the test unit.
- Introduce a constant source of fresh air to ensure complete air exchange.
- Standby person must be present until everyone has vacated the space.
- Full body rescue harness must be worn whenever in a confined space. A tripod with power assisted retrieval will be required for all vertical entries.

- Ladder, when used, must be secured and not be removed while workers are in the confined space.
- All electrical equipment must be properly grounded.
- “SAFE FOR WORKERS” permit.

8.2.5.4 Standby Person (Buddy System)

The standby person shall:

- perform and record confined space monitoring until work is completed.
- be current in First Aid and CPR training.
- be present at all times and have constant communication.
- not leave confined space without a backup standby.
- report an emergency, if necessary.
- in the event of a fire, major disturbance, emergency, etc., shall order employee(s) in the confined space to exit.

8.2.5.5 Permit Required Confined Space

A permit required confined space can be defined as having one or more of the following:

- The entrant could be entrapped;
- The entrant could be engulfed;
- The entrant could be exposed to a dangerous atmosphere; and/or
- The entrant could be exposed to any other serious health hazard.

All required confined space entry permits shall be posted near the entry and specify the following:

- Location of project;
- Task description;
- Hazard identification;
- List of personnel for entry;
- Special equipment such as tools and respiratory equipment;
- Atmospheric test results (oxygen, combustible gas, toxic);
- Special procedures required for approved entry (ventilation, lockout/tagout, chemical cleaners, decontamination); and
- Current signature approval of permitting authority.

An entry permit is voided if any of the following situations occur:

- Any condition which prohibits entry;
- Job is interrupted for more than 60 minutes;
- Illness or injury in the confined space; or
- Severe weather.

8.2.5.6 Ventilation

Ventilation procedures shall be implemented during all permit required entries. The following procedures shall be incorporated:

- Use intrinsically safe ventilation equipment;
- Blow into or through the space rather than exhaust from space;
- Vent or divert possible flammable vapors to a safe location;
- Continue ventilation to maintain flammable vapors below 10% and adequate supply of oxygen.

8.2.5.7 Monitoring

- The confined space shall be tested for oxygen deficient or enriched atmospheres, explosive conditions (10% LEL) and hazardous chemical concentrations above the PEL, TLV or IDLH.
- Record all monitoring results prior and during the confined space entry.
- Instruments shall be properly calibrated and intrinsically safe.
- Test all areas (top, middle and bottom) of a confined space.

8.2.5.8 Emergency Planning and Procedures

- Anticipate hazards (communication problems, fires).
- Develop a response plan (extraction, 911, emergency vehicle).
- Use safety harnesses and lifelines/lanyards.

Confined spaces can be deadly if safety procedures are not followed. Use the established guidelines and procedures. Do not enter a confined space if you are unsure or do not understand. Do not rely on your senses to tell you it is safe. TEST IT!

8.3 Activity Hazard Analysis

Please refer to Appendix H for Activity Hazard Analysis.

8.3.1 Biological Hazards

Potential biological hazards that may be encountered during operation of the above tasks include, rodent bites, snake bites, and insect bites/stings. Apply an insect repellent containing DEET every few hours when in insect-and spider-infested areas. Wash DEET off when you come inside. It is also recommended that one avoid wearing perfumes and colognes.

9.0 GENERAL HEALTH AND SAFETY PROGRAM

9.1 Training

All site personnel, including any subcontractor personnel, assigned to this project shall have satisfied the training requirements directly associated with this plan. The HASP Manager shall verify retention of safety practices, procedures, policies contained within this document by random query and verbal

test prior to affirmation of safe conduct by individual personnel. In addition, the following training requirements shall be satisfied:

- All site personnel assigned to the project shall be informed of, and trained on the content and application of the HASP. They will receive a copy of the HASP and sign a Health and Safety Plan Compliance Agreement upon completing of this training (see Appendix K);
- The HASP Manager has been trained in the use and maintenance of the air monitoring equipment, interpretation of data required to implement the HASP, and in-depth coverage of the elements of the HASP. Should any questions on site monitoring arise during the project, the HASP will consult with the CC/IH immediately.
- Selection, use, care, and maintenance of PPE;
- Medical surveillance requirements;
- Overview of "Safe Work Practices";
- Standard operating safety procedures;
- Personnel, as identified herein, responsible for site safety and health and emergency response operations.

Periodic on-site training shall be provided by the HASP Manager on a weekly basis when personnel are assigned to work at a site during the following week and prior to each change in operation. All required training shall be documented and maintain copies of all training certificates and record of training forms. Training records shall be maintained on-site during the project. Training logs shall be completed by the HASP Manager. These logs shall be used to document all on-site training (i.e., PPE, activity hazard analysis and work task, review of safety discrepancies and accidents, and the results of air monitoring data.). The format to be used shall have the following: date, employees in attendance and signatures, visitors in attendance, description of training activity and/or topics covered, equipment utilized, and signature of instructor.

9.2 Medical Surveillance

All Contractor employees should have received an extensive pre-employment medical screening. Personnel shall also receive periodic and follow-up examinations when appropriate. All medical monitoring information shall be properly documented and maintained in each employees' personnel file.

At least one member of the installation team working on site will be certified in first aid and CPR. The individuals will also be trained in universal precautions and the use of Personal Protective Equipment (PPE).

9.3 Hazard Communication

The contractor shall maintain a Hazard Communication Program for their employees (Appendix N). All field personnel assigned to the project shall have received Hazard Communication training prior to the start of this project. The contractor shall provide Material Safety Data Sheets (MSDSs) representing the chemical substances being temporarily relocated under the project. If a change in the scope of work requires the use of hazardous materials, the contractor shall provide and maintain copies of applicable MSDS's on-site and forward copies of each MSDS to the COTR.

The contractor shall insure that all containers of hazardous materials, new and used, are labeled in accordance with 29 CFR 1910.1200.

9.4 Respiratory Protection Program

The contractor shall maintain a Respiratory Protection Program for its employees as is presented herein. This program includes written procedures, training, medical surveillance, fit testing, maintenance of equipment and other components. All field personnel assigned to this project shall be covered under this program (or an equivalent program for subcontractor personnel) should the level of protection be upgraded from Level D/modified D to Level C during work activities. The contractors Respiratory Program shall be in compliance with 29 CFR 1910.134, ANSI Z88.2-1992, and ANSI Z88.6.

9.4.1 Selection and Use of Respiratory Protective Equipment

There are two general categories of respiratory protective devices; air purifying and supplied-air respirators. Supplied-air respirators will not be required on this project site.

9.4.1.1 Air Purifying Respirators (APR) Selection

Respiratory protection shall be worn when engineering controls or administrative controls cannot be successfully implemented in order to control a contaminant which has exceeded its 8-Hour Permissible Exposure Limit (PEL) under OSHA guidelines. Respiratory protection shall include the use of NIOSH approved half face air purifying respirators equipped with organic vapor/acid gas cartridges and High Efficiency Particulate Air (HEPA) prefilters.

9.4.1.2 APR Limitations

The following limitations apply to the use of APR:

- The odor threshold must be lower than the contaminants exposure limit (TLV/PEL);
- APRs cannot be worn in oxygen deficient atmospheres (less than 19.5% oxygen);
- APRs cannot be worn in areas where the contaminant has reached IDLH (Immediately Dangerous to Life and Health) conditions.
- APRs are non-functional if face seal cannot be maintained, therefore, The contractor and its subcontractor personnel are required to be clean shaven for this application

9.4.2 Protection Factor

APRs provide different protection factors as follows:

<u>APR Respirator Type</u>	<u>Protection Factor</u>
Half-face (dust, gas, or vapor)	10X
Full-Face	50X

Maximum Protection = Protection Factor x TLV/PEL (example: the maximum concentration of ammonia in which a half face respirator could be worn is 250 ppm (PF = 10X x TLV = 25 ppm).

9.4.3 Cartridge Color Codes

Following are the descriptions of cartridge color codes:

Airborne Contaminant	Cartridge Color
Acid gases	White
Organic vapor	Black
Acid gas & organic vapors	Yellow
Radioactive particulate, asbestos, dusts, fumes, and mists	Yellow with Purple Stripe
Ammonia Gas	Green

The government anticipates minimal use of Air Purifying Respirators and/or masks. The levels of contaminate are expected to be associated with nuisance odors and dust particulate matter from the demolition processes, both of which can be removed to below safe levels by venting the spaces. Should odors and dust detract from the activities of any personnel, appropriate APR/Masks shall be available at the site by the contractor.

9.4.4 Donning Procedures

The following donning procedural sequence is applicable to reusable Air Purifying Respirators:

Step 1. Affirm the following:

- Right type and size APR;
- Correct cartridge for circumstance of exposure and suspect environment;
- Shelf (storage) life has not been exceeded (if applicable)
- APR properly sanitized and stored.

Step 2. Inspect the APR by:

- Checking the cartridge seal;
- Checking the straps;
- Checking the face piece for cracks and deformity;
- Checking the suppleness of the body material; and
- Checking the exhalation and inhalation valves.

Step 3. Put on the APR chin first and tighten the straps

Step 4. Fit check the seal by completing the following:

- Positive fit check - Cover exhalation valve and blow out. Mask body should inflate on the face without any leaks occurring;

- Negative fit check - Cover the inhalation valves and inhale. Mask body should deflate inwards towards the face.

Note: Fit check will fail for all personnel and/or visitors with facial hair. Failure of fit check requires limited/restricted entry for visitors and may result in reassignment of team member.

Step 5. Replace cartridge when:

- Breathing becomes difficult; or
- Chemicals can be smelled or tasted; or
- More often (every shift) as recommended.

9.4.5 APR Sanitation

9.4.5.1 Procedures

The Contractor and/or its subcontractors will be responsible for maintaining supplies for employee sanitation procedures. Employees will be held responsible for the sanitation of their reusable respirators. Sanitation guidelines followed are listed below:

- The employer shall provide means for cleaning all respiratory protective equipment;
- Routinely used respiratory protective equipment shall be kept in resealable packaging when not in use;
- Emergency respiratory protective equipment shall be sanitized after each use and prior to storage;
- Respiratory protective equipment will be freshened up before each use or transfer to others by using an alcohol free wipe pad.

9.4.5.2 Full Sanitation Scheduling Criteria

- If the reusable respirator is used daily, full sanitation is to be performed weekly.
- If the reusable respirator is used weekly, full sanitation is to be performed monthly.
- If the reusable respirator is used monthly, full sanitation is to be performed quarterly.
- If the reusable respirator is used as emergency equipment, full inspection and sanitation is to be performed quarterly. When used, full sanitation is performed prior to returning to ready status.

9.4.5.3 Sanitation Processing

Personnel responsible for sanitation of reusable APR must perform the sanitation process in circumstances conducive to accomplishment without contamination or possibility of foreign matter being introduced with the stored APR. While performing full sanitation, eye protection, neoprene gloves and full-length apron are required to be worn. Full sanitation requires the following to be performed:

- Remove the respirator cartridges or hose;
- Inspect the cartridge and/or hose for degradation. Note necessary replacement requirement.
- Fill an appropriately sized, clean, container with lukewarm water;
- Add chlorine bleach to the water at a ratio of 8 ounces per gallon;
- Wash the respirator in the solution and then soak for 5 minutes;

- Rinse the respirator with cold water;
- Place on a towel and allow to air dry.

9.4.6 APR Storage

When not in use, new and/or reusable respiratory protective equipment shall be stored in a zip-lock bag or dust-proof carrying cases to protect it against dust or damaging chemicals; sunlight or extreme temperatures; and excessive moisture. Storage shall be such that the protected APRs are not subject to physical damage or permanent deformation of the body.

When issued to personnel on an individual basis, each reusable respirator shall be individually assigned and not interchanged among employees without first cleaning and disinfecting.

9.4.7 Individually Assigned Reusable Respirator Fit-Testing

Each employee will be either quantitatively or qualitatively fit-tested semi annually as a minimum with the respirator(s) they are issued to ensure proper protection. Fit testing shall be performed using irritant smoke tubes, in accordance with ANSI Z88.2, 29 CFR 1926.1127 and 29 CFR 1910.134. Isoamyl acetate ampules will not be used, except as a preliminary test prior to testing with irritant smoke tubes. Proof of respirator fit testing and training shall be maintained by the HASP Manager.

10.0 PERSONAL PROTECTION AND SAFETY

10.1 Safe Work Practices

The following are safe work practices which shall apply to this project:

- Eating, drinking, use of gum or tobacco products or the applying of cosmetics shall only be allowed in designated areas;
- Smoking and any other sources of ignition shall be prohibited within 50 feet of any work area and sources of flammable/combustible chemicals. Areas will be marked where smoking is permitted;
- Personnel shall participate in Tailgate Safety Meetings;
- Personnel shall continually observe their work location and be alert to changes in the environment that may affect safety;
- Personnel shall plan and prioritize their tasks prior to donning protective clothing;
- Personnel shall only enter regulated work areas when instructed by the Site Supervisor, and shall only enter through designated control points;
- Personnel shall report any accident, near miss or unusual situations to the HASP Manager;
- Personnel shall use the PPE provided and as instructed by the HASP Manager;
- Personnel shall not wear or carry personal items (i.e. jewelry, watches, gum, tobacco products, etc.) into regulated work areas;
- All machine tools and safety equipment shall be inspected prior to use;
- All vehicles and construction equipment shall be inspected prior to use;
- The buddy system shall be used for all personnel entering confined spaces;
- Personnel working together (i.e. buddy system) shall continually be aware of their partner;
- Personnel shall work purposefully and as a team;
- Personnel shall work within their own physical and mental limits;

- Personnel shall take adequate rest breaks and replace body fluids (water and electrolytes) continuously;
- Personnel shall at all times follow the instructions of the Site Supervisor/HASP Manager;
- Personnel shall not deviate from the HASP or the instructions of the Site Supervisor;
- Personnel shall avoid rushing and/or taking short cuts;
- All waste/refuse generated shall be handled and disposed of as identified herein. No waste/refuse shall be disposed of without the direction of the Site Supervisor; and
- Personnel shall perform visual checks and safety inspections on machinery and equipment prior to its use.

10.2 Levels of Protection

Personal protective equipment (PPE) is required to be worn/used as dictated by the levels associated with the duties performed or supervised. The purpose of personal protective equipment and clothing is to isolate individuals from chemical and physical hazards. Authorized site visitors shall be responsible for providing own required PPE (safety glasses, hard hats and steel-toed shoes). Level of protection will be selected or deemed necessary by the HASP Manager. Level of protection at any site will be selected on a site specific/task specific basis; however Level D will be worn as minimum for all site activities. The equipment list given below includes information on all levels of protection.

OSHA Level D: This is primarily a work uniform.

Level D is the basic work uniform that will be used. It provides only minimal protection.

- Hard hat;
- Shoes (steel toed);
- General work clothes;
- Safety glasses or safety goggles;

OSHA Modified Level D: Same as Level D with an increase protection level against cold temperatures. No air purifying respirator.

- Insulated Coveralls: These coveralls shall be oversized to allow several layers of wool or pile or polypropylene clothing inside. (Optional);
- Boots: Chemical resistant, steel toe, and shank (ANSI Z41, Safety Toe Footwear, Classification 75). Boots shall be equipped with deep traction sole and be oversized to allow two to three layers of woolen or similar socks inside;
- Gloves: Chemical (PVC, Neoprene, Nitrile) gloves shall be oversized to allow two to three layers of wool or similar gloves inside (optional);
- Safety glasses or goggles to guard against wind blown debris and temperature reduction; and
- Hard hat (ANSI Z89.1, Class A, B, and C). This hard hat shall incorporate a liner.

OSHA Level C:* Level C:* PPE will only be utilized by The contractor and/or subcontractor personnel during shipchecks to confirm and verify that the unoccupied spaces have been cleared and cleaned of hazardous material, fluids and solids.

- Half-face/Full-face air purifying respirator with organic vapor cartridges: A dual cartridge with organic vapor and HEPA capabilities will be implemented for dust exposure;
- Tyvek/Saranex coveralls - Refer to Modified Level D;
- Neoprene outer gloves - Refer to Modified Level D;
- Cotton inner gloves - Refer to Modified Level D;
- Hard hat with face shield (where applicable) - Refer to Modified Level D;
- Steel toed rubber boots - Refer to Modified Level D;
- Rubber boot covers (where applicable);
- Chemical goggles (where applicable);
- Hearing protection (where applicable); and
- Safety glasses (where applicable).

* Protective clothing material must be compatible with the identified hazardous substances released or normally contained within the space. In an unknown situation, the material providing the highest overall protection will be utilized.

No individual will enter an area where respiratory protective equipment is required unless the person has been trained in the selection, use, care and limitations of the respirator, and the proper respirator has been selected for the task. Proper selection of respirators is to be made according to guidance provided by ANSI standard Z88.2. The correct respirator is to be specified for each job.

Whenever respirators are required, only equipment approved for that purpose will be used. This equipment must be approved by the National Institute for Occupational Safety and Health (NIOSH). Only parts approved for the specific respirator system are to be used for replacement. Only a person specifically trained should perform work with respirators.

10.3 PPE Inspection Program

Regular inspection of PPE, together with respiratory protective equipment shall be performed. The HASP MANAGER shall ensure the following during PPE inspection:

- All equipment shall be inspected by the wearer prior to use;
- Respirator cartridges shall be disposed of daily (i.e. not reused);
- Respirator cartridges shall be changed during a work shift if the wearer experiences breakthrough, resistance or uncomfortable warm inhaled air, or if the respirator/cartridges become wet or grossly contaminated;
- Disposable protective items may be reused during a work shift provided they are not damaged or obviously contaminated. Disposable items shall be disposed of daily; and
- Reusable protective items shall be cleaned and inspected daily.

10.4 Care of Equipment

Personal protective equipment offers a high degree of protection only if maintained and inspected on a regular basis.

Gloves, uniforms, and work clothes - Gloves, uniforms, and work clothes will be inspected, repaired or replaced promptly if determined unserviceable.

Reusable Respirators - Reusable respirators will be inspected and leak-checked each time they are put on. Respirator cartridges will be replaced daily, or more frequently if excessive resistance or breakthrough develops. All respiratory maintenance will be performed by a trained personnel in a controlled environment. When used continuously, respirators will be cleaned daily. Each individual operating in conditions requiring the use of a respirator will be assigned exclusive use of a respirator. These respirators will be stored in separate plastic storage boxes with individual names on them.

10.5 Coverage

The wearing of approved hard hats (ANSI Z89.1 approved) on job sites is mandatory for all tasks. Appropriate work clothing (OSHA Level D) will be worn at all times to minimize the hazards from work. The initial minimum protective equipment requirements for each major task and operation are listed below.

<i>Tasks/Operation</i>	<i>Initial Level of Protection</i>
Shipcheck/Audit	Level D or C (for unoccupied spaces)
Mobilization @ Temperatures above 50°F	Level D
Mobilization @ Temperatures below 50°F	Modified Level D
Demolition	Level C or D, as determined by HASP Manager:
Installation	Level D
Demobilization	Level D

10.6 Equipment Selection

The HASP Manager will be in charge of equipment selection and inventory. The level of protection may be upgraded or downgraded by the HASP Manager as conditions change at the site/aboard the vessel. Decisions for downgrading PPE requirements shall be authorized by the HASP Manager. The COTR shall be notified by the HASP Manager of decisions to adjust PPE requirement. COTR approval is not required prior to implementation.

Reasons to upgrade include:

- Change in work task that will increase contact or potential contact with hazardous materials;
- Action level is detected during monitoring; and
- Request of the individual employee.

Reasons to downgrade include:

- New information indicated the situation is less hazardous than originally believed;
- Change in site conditions that decreases the hazards; and
- Monitoring or lab analysis support a decision to downgrade.

11.0 STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, WORK PRACTICES, PROCESS SAFETY MANAGEMENT

The site safety requirements and procedures applicable to this project include site control and decontamination, sanitation, safety meetings, accident reporting and investigations, safety inspections, housekeeping and related items.

11.1 Purpose

The purpose of the following is to augment, amplify, or provide specific health and safety policies, procedures, and requirements as they relate to the Halon Replacement Contract.

11.2 Order of Precedence

In the event any of the following policies, procedures, and requirements differ or conflict with those identified in Paragraph 5.1, Scope, and otherwise identified herein, the more stringent requirement shall apply.

11.3 Definitions

11.3.1 Incident

Incidents are any circumstance that may/does result in damage to equipment or personal injury. Incidents are also those circumstances which result in unplanned action. Incidents include, but are not limited to:

1. Damage, destruction, or loss of Government property other than as identified in the Detailed Design/Installation Drawings and Installation Specification.
2. Unintentional discharge of CO₂, Halon 1301, or FM-200 compressed gas.
3. Damage to contractor property (excludes on-the-road vehicle damage).
4. Fire onboard a vessel which was extinguished by the Contractor Installation Team but resulted in damage or destruction to Government property.
5. Fire onboard a vessel which required assistance to extinguish or was extinguished by other than the Contractor Installation Team.

11.3.2 Reportable Accident

Reportable accidents are any injury experienced on-site, by any individual or group, that requires other than routine first aid care. Non-Injurious reportable accidents are those where contractor property is damaged or destroyed. Specific accidents requiring reporting include, but are limited to:

1. Injury to contractor personnel which requires other than routine, on-site first aid.

2. Injury to any Government personnel.
3. Injury to authorized visitors.
4. Accidents in which contractor property is damaged (excludes on-the-road vehicle damage).

11.3.3 Incident Report

A detailed report, prepared by the on-site HASP Manager, which documents an incident. Should the investigation reveal a means to prevent reoccurrence of the incident, the HASP Manager shall immediately institute a policy to eliminate possibility of reoccurrence. The policy shall immediately be disseminated to all members of Installation Teams. A copy of an Incident Report is provided at Appendix B.

11.3.4 Incident Report/Investigation Log

A log, maintained by the HASP Manager, of all Incident Reports and Incident Investigation Reports. A copy of an Incident Report/Investigation Log is provided at Appendix C.

11.3.5 Incident Investigation Report

A detailed report, prepared by the HASP Manager, which documents the results of an incident investigation. A copy of an Incident Investigation Report is provided at Appendix D.

11.3.6 Accident Report

A detailed report, prepared by the on-site Supervisor, which documents an accident. A copy of an Accident Report is provided at Appendix E.

11.3.7 Accident Report/Investigation Log

A log, maintained by the HASP Manager, of all Accident Reports and Accident Investigations. A copy of an Accident Report/Investigation Log is provided at Appendix F.

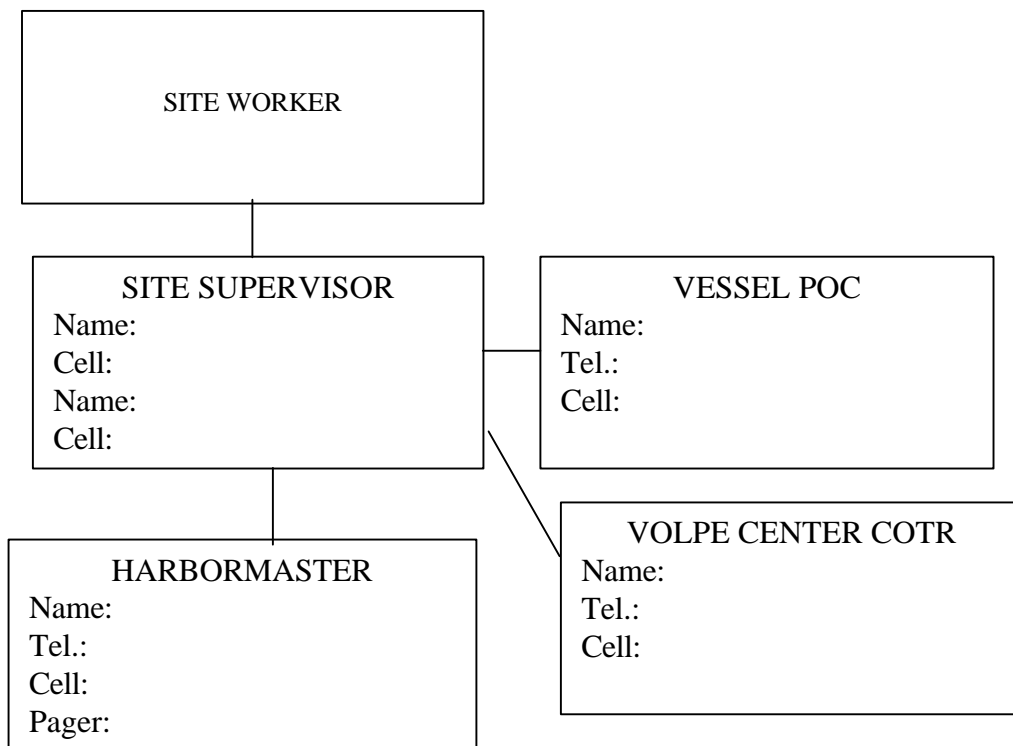
11.3.8 Accident Investigation Report

A detailed report, prepared by the HASP Manager, which documents the results of an accident investigation. A copy of an Accident Investigation Report is provided at Appendix G. Should the investigation reveal a means to prevent reoccurrence of the accident, the HASP Manager shall immediately institute a policy to eliminate possibility of reoccurrence. The policy shall immediately be disseminated to all members of the Installation Team.

Accident/Incident Reporting Chain

A visual presentation which provides the reporting chain for all accidents and incidents along with means to contact HASP personnel by telephone, facsimile, and e-mail follows:

HASP ACCIDENT/INCIDENT REPORTING CHAIN



11.3.10 Shipcheck

Refer to the SOW.

11.3.11 Site Surveys

Refer to the Statement of Work. Additionally, the Site Survey will identify the location, operating hours, and telephone numbers of medical, safety, and environmental response organizations and offices; identify the infrastructure in the immediate area and note any curtailment of access to specific areas or road usage limits. The site survey will also identify acceptable temporary storage and vehicle access, and security issues for the Installation Team.

11.3.12 Site Specific Emergency and Non-Emergency Telephone Listing

A listing of emergency response organizations, both military and public, that are located closest to the installation site. The listing will include entries for emergency response to fire alarms, unsafe conditions threatening personnel and/or material, medical emergencies, police (Federal, military and civilian), and environmental spills or special conditions. The listing also includes the numbers of the HASP management personnel. This listing will also be included in the HASP by timely revision and page insertion.

11.3.13 Medical and First Aid Supplies

Contractor equipment, devices and products that are necessary to provide immediate comfort or aid to Team Personnel in the event of an accident or injury. At a minimum, material that shall be included are:

- Unitized First Aid Kit.
- Emergency Burn Dressing Kit.

11.3.14 Emergency Medical Facilities

Identify Facilities where trained life saving and support services are available. Such facilities may include:

- Clinics
- Hospitals
- Emergency Medical Facilities
- Fire Stations
- Police Stations
- Immediate Care Centers
- Doctors Offices

11.4 Site Surveys

Prior to initiating installation, the contractor shall perform a site survey for each location where vessels are located. As part of this survey, emergency and non-emergency phone numbers for the fire department, ambulance, Military Police, Harbormaster, and Transportation Branch Marine Safety Office will be obtained and posted to the Site Specific Emergency and Non-Emergency Telephone Listing. The survey will also yield a pictorial map that indicates the location and routes to the emergency response organizations listed in the Site Specific Emergency and Non-Emergency Telephone Listing.

11.4.1 Site Specific Emergency and Non-Emergency Telephone Listing

A listing will be prepared of emergency response organizations that are located within ten miles of the installation site. The listing also includes the numbers of the HASP Manager. The completed Site Specific Emergency and Non-Emergency Telephone Listing will be posted at the work site in a place readily accessible to all personnel (mess deck area and outside main E.R.) and in each company vehicle. The contractor shall provide a site specific listing for each home port where installations are to be performed. As they become identified, the HASP will be updated and revised to include this information. Copies of the blank form may be found in Appendix I.

11.5 Boarding and Departing U.S. Army Vessels

11.5.1 Prior to Boarding Vessels

Prior to boarding a U.S. Army vessel, the HASP Manager will brief all members of the Installation Team. They shall be advised that under no circumstance to make use of Government property (i.e. telephone), other than that mutually agreed to during the site survey, and are not to make any adjustments to equipment or systems other than those under the scope of this contract.

11.5.2 Daily In-Briefings

11.5.2.1 Shipcheck In-Briefing

The In-Briefing conducted during each Shipcheck will identify to the officers of the vessel exactly what requirements must be met prior to the arrival of the Installation team. The In-Briefing will include identification of such items that must be removed and stored, the cleanliness and dryness of the bilge and below deck spaces, crew interaction, vessel access (including the removal of locks and seals from escape scuttles), the general housekeeping parameters and proposed work schedule.

The Shipcheck In-Briefing will also notify the crew of the desire for rigging and readying the P-100 Emergency Fire and Salvage Pump for use during the total time of installation, not exclusively for that period when the fire main is off-line/inoperable for WWS tie-in. If the crew cannot provide the P-100 and/or maintain the bilge and unoccupied spaces in a relatively dry condition, the contractor will be required to provide the safety pump for coverage of Fire Main Pump down time and for bilge cleaning and maintenance of gas free atmosphere. In addition, should the vessel provide only limited, or inaccessible, electrical power, portable power generation will also be provided by the contractor.

11.5.2.2 Installation In-Briefing

Upon requesting and receiving permission to board a U.S. Army vessel, the HASP Manager/Site Supervisor will in-brief the vessel Duty Officer/watch and attending Volpe Center personnel each day. This will consist of providing an overview of efforts projected for the day, identification of the spaces to be worked in and for which access is required, as well as providing a list of names, by company, of contractor personnel boarding and working on the vessel. Additionally, the Duty Officer/watch will be advised prior to rendering any system inoperable. An example of this is the Fixed Halon Fire Extinguishing System which will be inoperable from the start of rip-out through Volpe Center acceptance of the installation. Administrative information will be exchanged. The Daily In-Briefing may be held as part of the Tail Gate meeting in order to provide a seamless understanding of the days activities and requirements.

11.5.3 Tail Gate Safety Meetings

The HASP Manager/Site Supervisor shall conduct a Tailgate Safety Meeting with all site personnel, including any subcontractor personnel, at the beginning of every shift. A copy of each days Tailgate Safety Meeting Form (Appendix L) shall be maintained at the immediate work site and shall be available for site personnel and site visitor review. All site visitors are to be briefed on the operations and daily Tailgate Safety Meeting information prior to boarding the vessel and entering work spaces. Visitors shall also be required to sign the On-Site Visitor Information Form/Visitor Certification prior to boarding the vessel (see Appendix O). Copies of all Tailgate Safety Meetings shall be maintained on-site during the project, and shall be provided to the COTR upon request.

11.5.4 Daily Out-Briefings

Thirty (30) minutes prior to the end of the duty day, the HASP Manager will out-brief the Duty Officer/watch and attending Volpe Center personnel. This will consist of providing an overview of in-progress and completed efforts, status of fixed fire extinguishing systems, any contractor equipment or supplies left onboard, planned date and time of return to vessel, and compartments required for entry as well as the exchanging of any administrative information. Additionally, the HASP Manager will provide the vessel Duty Officer/watch and attending Volpe Center personnel a listing identifying:

1. Contractor personnel and time duration, who were onboard the vessel during the duty day.
2. Spaces worked in.
3. Contractor materials left onboard.
4. Any problem areas.

11.6 Site Control

Site control procedures for this project shall include the establishment of work zones at each work location, providing site security to warn of unauthorized access and to secure work locations between shifts. All work zones shall be established daily before beginning operations. Site control requirements shall be reviewed during daily Tailgate Safety Meetings.

Site security shall be established by clearly marking all work zones at all possible locations of entry by unauthorized personnel in order to minimize and prevent public exposure to hazards created by site activities. In addition, the HASP Manager as well as any subcontractor employees shall observe for pedestrian and vehicle traffic that may unknowingly enter designated work areas, and take action to stop their unauthorized entry. When necessary, site personnel may be assigned as security in order to warn persons or vehicles of the adjacent operation.

11.6.1 Site Security

Before site operations begin, warning flags, boundary tape, and/or signs which read

**KEEP OUT
AUTHORIZED PERSONNEL ONLY
USE CAUTION UPON ENTRY**

will be posted by the contractor pierside and at the access to spaces subject to installation in all vessels. The restriction will remain in place until after acceptance testing is performed and the spaces returned to military control.

11.6.2 Safety Inspections

The HASP Manager/Site Supervisor shall perform a daily safety inspection of the work site. The daily safety inspections shall be documented using the Safety Inspection form. The Site Supervisor shall ensure that all immediate hazards are corrected before work proceeds and that all other hazards and potential safety situations are corrected in a timely manner in relation to this project (i.e. one to three days). Copies of all safety inspections shall be available for field personnel review, shall be maintained on-site during the project, and shall be provided to the COTR upon request. A copy of the Safety Inspection Report Form is presented at Appendix M.

In addition, the Site Supervisor shall perform a specific safety inspection of each piece of equipment to be used that day (i.e. hand and power tools, ladders, scaffolding etc.). Any defective equipment shall be repaired or replaced prior to use.

11.7 Accident Investigations

In the event of an injury, illness or near miss, it shall be immediately reported to the Site Supervisor. If required, emergency medical care or first aid shall be rendered. The Site Superintendent shall then initiate an Accident Report, and any other documents required for injury/illness reporting and worker's compensation claims.

As soon as possible after the occurrence of an occupational accident, the HASP Manager shall initiate an Accident Investigation. The accident investigation shall be documented on an Accident Investigation Report (Appendix G). The purpose of the accident investigation is to identify the causes of the incident in order to take corrective action to prevent future occurrences.

In addition, the HASP Manager shall immediately notify the COTR of the reported injury, illness or near miss. Finally, the HASP Manager shall maintain a project log of all recordable injuries and illnesses.

11.8 Personal Hygiene

The contractor shall ensure that adequate drinking water, toilet facilities and hand washing facilities are available daily to all contractor site personnel. For drinking water, at least one gallon per person shall be provided daily. Potable water shall be supplied from a pressurized source (i.e. tap water) or commercially available bottled water. Disposable drinking cup shall be provided at each work location, and shall be stored and made available in a sanitary manner. Any non-potable sources of water shall be clearly marked.

Toilet facilities shall be immediately available at all times to site personnel (i.e. on-site or immediately adjacent rest room facilities or on-site portable chemical toilets). Toilet facilities shall be within immediate access for site personnel (i.e. within five minutes).

Hand washing facilities shall be provided at each work location (support zone). Hand washing facilities shall consist of soap, clean water, wash basins and single use towels. Any waste water collected shall be disposed of properly.

11.9 Housekeeping

A strict housekeeping program shall be implemented daily at each work location. The purpose of the housekeeping program is to reduce or prevent accidents and prevent to unwanted spread of contamination, debris or other material to any areas. The Site Supervisor shall be responsible for ensuring that good housekeeping is maintained at all times during the project.

The following housekeeping procedures apply to this project:

- Only in-use equipment and tools shall be off-loaded from vehicles;
- Work areas shall be continuously "policed" by site personnel and the Site Supervisor for cleanliness and orderliness;
- All spills shall be immediately cleaned up;
- No loose debris shall be left in any work area, or allowed to leave any work area either by vehicle, foot or wind movement;

All site personnel shall be instructed on the basic emergency actions to take in the event of a medical emergency. This instruction shall include actions to take to preserve personal safety, how to make emergency notifications, basic first aid/assistance procedures, staging and use of emergency equipment and evacuation procedures, and shall be reviewed during each Tailgate Safety Meeting.

11.10 Fall Protection

Employees shall be protected by standard guardrail, catch platforms, temporary floors, safety nets, or personal fall protection devices in the following situations:

- on access ways (excluding ladders) or work platforms from which they may fall 6 feet or more,
- on access ways or work platforms over water, machinery, or dangerous operations,
- on runways from which they may fall 4 feet or more.
- Around all open deckplates.

Note: For ladder requirements, refer to paragraph 11.15

All employees will be trained by the HASP Manager in the safe use of access ways and fall protection systems, and the recognition of hazards related to their use, including:

- 1) the nature of access and fall hazards in the work area,
- 2) the correct procedures for constructing, erecting, inspecting, maintaining, using, and dismantling access ways and fall protection systems,
- 3) the maximum intended load-carrying capacities of access ways and fall protection systems, and

11.11 Lockout/Tagout Procedures

11.11.1 Purpose

The purpose of this written program is to prevent injuries and accidents from energized electrical sources and other types of stored energy during the installation, maintenance and removal of such equipment and machinery. This program covers the servicing and maintenance of machinery and equipment in which the unexpected energization or start-up of the machine or equipment, or release of stored energy could injure employees. This energy can be in the form of electricity, air pressure, water pressure, spring pressure or potential energy of position. The program establishes the procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to disable machines or equipment to prevent the unexpected energization, start-up or release of stored energy.

The Lockout/Tagout Program shall meet all applicable federal, state and local regulations, including 29 CFR 1910.147 "The Control of Hazardous Energy (Lockout/Tagout)".

11.11.2 Responsibilities

Site Supervisory personnel are responsible for:

- a) Ensuring only "Authorized Workers" are assigned to work on energized systems.
- b) Ensuring that the provisions for the written program is implemented and that all employees follow the requirements of the written program. Disciplinary action may be taken against any employee who fails to follow or enforce the program.

Employees are responsible for:

- a) Compliance with the Lockout/Tagout Program.
- b) Upon observing a machine or piece of equipment which is locked out, not to remove tag or lock and to not attempt to start, energize, or use the machinery or equipment.

11.11.3 Training

All authorized employees shall receive on-site training in the recognition of applicable hazardous energy source, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control. All affected employees shall be instructed in the purpose and use of the energy control procedure.

All employees whose work areas are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedures, and about the prohibitions relating to attempts to restart or energize machinery or equipment which is locked out or tagged out.

Retraining shall be provided for all authorized and affected employees whenever:

- a) There is a change in job assignments.
- b) There is a change in machines, equipment or processes that present new hazards.
- c) Whenever inspections reveal or the employer believes there are deviation or inadequacies in the program.

11.11.4 Procedures

Preparation for Lockout

Authorized employees shall determine which switch, valve or other energy isolating devices shall be used. More than one energy source (electrical, mechanical, pneumatic) may be involved. Before lockout commences, authorization shall be obtained from the Site Supervisor and vessel Chief Engineer, Duty Officer, or Watch.

Sequences of Lockout Procedures

Notify all affected employees that a lockout is required and the reason. If the equipment is operating, shut it down following normal procedures. Operate the switch, valve or other energy isolating devices so that the energy source is disconnected or isolated from the equipment. Stored energy must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding, etc. Lockout energy isolating devices with an individually assigned lock. After ensuring that no personnel are exposed, ensure that the equipment will not operate by engaging the power button or normal operating controls.

Procedures Involving More Than One Person

If more than one individual is required to lockout equipment, each shall place his/her own lock on the energy isolating device. One designated individual or supervisor, with knowledge of the work crew, may lockout/tagout for the entire crew. No member of the work crew shall start work until advised by the designated individual that the lockout is complete and it is safe to begin. The designated individual is responsible for carrying out all the steps of the lockout procedures. The designated individual shall not remove any lock or tag until personally verifying that all members of the crew are clear of the equipment.

Procedures Involving Personnel Changes During the Job

Employees being replaced or exchanged on a job during a shift shall ensure that the lock and tag of his/her replacement are substituted for his/her own before leaving the job. Employees being replaced on a job at the end of a shift shall ensure that the locks and tags of the replacement employee are substituted for his/her own before leaving the job.

Procedures When Work is Left Unfinished

Locks, tags and all other safety warning devices shall be left in place during all short absences such as breaks or trips for parts. When work is incomplete and temporarily suspended, all locks, tags and other safety warning devices shall be left in place.

Actions When Physical Locking is Impossible

When it is impossible to use a lock, another means of disconnecting the equipment or machinery must be used. Other means include: unplugging the equipment, disconnecting the conductors, fuse brackets, removing fuses, or opening circuit breakers. All steps of the process are the same as Lockout. A tag must be placed on the plug, conductor, fuse bracket, circuit breaker, or other means.

Restoring the Equipment to Service

Close and secure all cover panels and doors. If all cannot be closed, place barricades or rope off a safety zone. Advise all affected employees that the system is to be re-energized. Ensure that all persons are clear of the equipment. Notify vessel Chief Engineer, Duty Officer, or Watch. Remove all locks and tags. Only the person who placed the locks and tags may remove them. If the person is unavailable, only the Site Supervisor may remove the locks and tags after personally ensuring it is safe to do so. Energize the equipment thereafter.

11.12 Fire Prevention and Reporting

11.12.1 Fire Prevention

The following fire prevention rules shall apply to all members of the Contractor Installation Team members and activities:

- No burning of trash or rubbish will be allowed.
- Prior to use, temporary heating devices shall be approved by the HASP Manager.
- Work site(s) will be cleaned daily, or more often if required.
- All members of the Contractor Installation Team will be educated in the type, location, and proper use of portable fire extinguishers and portable pumps expressly reserved for fire fighting.
- When not in use, all flammable and combustible liquids and gases shall be stored in approved containers.
- Temporary and supplemental fire fighting equipment will be provided when the fire main is disabled for WWS tie-in.

11.12.2 Welding, Burning, Grinding, or Other Hot Work

In addition to the requirement for the space(s) to be certified as Safe for Workers and Safe for Hot Work, the following shall apply:

- During all hot work, a fire watch shall be posted.
- The fire watch shall be equipped with an approved, portable fire extinguisher(s).
- The proper safety, protective clothing and equipment shall worn during hot work operations.
- Electric powered welders shall have an approved ground.
- All welding leads shall be fully insulated.

11.12.3 Fire Reporting

In the event of a fire which cannot be extinguished by the Contractor Installation team, the following action shall be taken:

1. Abandon space.
2. Immediately notify the Vessel Chief Engineer, Duty Engineer, or watch.
3. In the event the vessel is not manned by an Army crew, the fire shall immediately reported to the Fire Department and Harbormaster. Emergency phone numbers for the Fire Department and Harbormaster are posted on the Site Specific Emergency and Non-Emergency Listing.
4. Follow directions issued by the Fire Department and/or Harbormaster.
5. Prepare an Incident Report.

11.13 Hand Tools and Power Tools

The following shall be observed when using contractor supplied hand or power tools:

- All hand and power tools shall be kept sharp and in good state of repair.
- All pneumatic lines shall have safety lashings installed at all connections.
- Power actuated tools shall be operated only by authorized personnel. Authorization will be provided by the Site Supervisor.

11.14 Ropes, Slings, Chains, and Other Lifting Devices

11.14.1 Inspection

Prior to use, all contractor provided lifting devices shall be inspected. The following shall be observed:

- Safe Working Load (SWL) Certification.
- Defective lifting equipment, devices, or inseparable assemblies shall be condemned and removed from the site.
- Separable hooks, shackles, rings, etc., which are bent, twisted, or indicate excessive wear shall be condemned and removed from the site.
- Work requiring the use of lifting equipment, devices, assemblies or components which have been condemned will be suspended until acceptable materiel is provided.

- Condemned components will be immediately removed from the work site.
- Only contractor supplied equipment will be used.

11.14.2 Proper Use

- All lifting devices shall be used only as design intended.
- SWL rating of any lifting device shall not be exceeded.
- All lifting devices shall be maintained in good state of repair.

11.15 Ladders and Scaffolds

The following shall be observed prior to and during use of contractor supplied ladders and scaffolding:

- Ladders and scaffolds shall be inspected prior to use and daily thereafter.
- The incline ratio of ladders shall be a minimum of 4 to 1.
- Under no circumstances are the top rung of ladders or scaffold to be used for standing.
- Ladders and scaffolding shall be secured and anchored to prevent movement.
- Personnel shall ascend and descend ladders and scaffolding using both hands and feet. Equipment, components, hand tools, etc., shall be lifted or lowered separately.
- For any height greater than 5 foot 7 inches, a safety belt or harness shall be worn.
- On structures or work areas over 20 feet in height, a stairway shall be erected or provided (see note).

Note: Initial evaluation of the vessels subject to refit indicate that the highest level at which work may be performed is approximately sixteen feet above deck. Therefore, erection of stairways should not be required.

11.16 Machinery and Mechanized Equipment

The following shall be performed prior to dispatching any contractor provided hand tools, powered hand tools, machine tools, and/or mechanized equipment to the work site:

- All equipment and machinery shall be inspected by a qualified contractor employee. A copy of the inspection data will be furnished to the HASP Manager.
- Cranes and other mechanized lifting equipment shall have a current Load Test Certification. The Certification shall accompany the item of equipment.
- Operating rules for all machinery and mechanized equipment shall be readily available with the item of equipment.

11.17 Portable Electrical Equipment

The following shall apply to all portable electric equipment:

- All plugs and outlets shall conform to NEMA requirements.

- GFI shall be used on temporary power.
- Portable generators rated at 5KW or greater shall be grounded. (NOTE: Portable generators rated at less than 5KW, having secondary conductors insulated, are not required to be grounded.
- Frayed, cut, or badly abraded and kinked electrical cords are immediately condemned and removed from the work site.
- Only power tool and extension cords in excellent condition shall be used.
- Only approved extension cords shall be used.

11.18 Compressed Gas Cylinders

The transportation and movement of compressed gas cylinders and pressurized cans shall be conducted in accordance with Department of Transportation and Compress Gas Association regulations. In particular, the following shall be adhered to:

- All cylinders shall be transported by certified carriers in an upright position, segregated by flammability and possible interaction. The certification will be current and dated.
- All road transport vehicles will properly display warning placards.
- When moved and transported from place to place for the purpose of installation or staging to secure storage, the cylinders will be cradled by specially designed fixtures and transported through passageways, hatches, doorways and over obstacles in the horizontal position. The cylinders, when transported horizontally, will be secured in place and physically guarded against contact with all obstructions
- All cylinders, when not in use or installed, shall have the valves closed, safety caps installed, and be secured in place.
- All cylinders, at all times, shall be firmly secured to prevent inadvertent movement.
- Different types of gas shall be segregated (stored in separate locations) in a secured location.
- Oxygen, oxidizers, and flammable gas cylinders shall be separated, as will cylinders containing materials that are known to interact.
- Cylinders will be labeled as to their content. Only the material identified on the cylinder will be contained within the container.
- When installed each cylinder will have identification placards identifying the material under pressure, the maximum pressure, flammability, and warnings.

11.19 Temporary Bulkhead and Deck Openings

Temporary bulkhead and deck openings will not be permitted without direct permission from the COTR.

11.20 Material Safety Data Sheets

The HASP Manager shall be responsible for ensuring Material Safety Data Sheets (MSDS's) for all chemicals and gasses transported to or from the work site and used at the work site are made available. MSDS's for all applicable material will be stored at the site, in the custody of the contractor. Copies of MSDS's that are transported by contractors vehicles will be stored in the transport vehicle in the Vehicle Log.

11.21 Halon 1301 Cylinders and Agent

11.21.1 Requirements

1. All Halon 1301 cylinders and agent removed from U.S. Army vessels, shall remain the property of the U.S. Army.
2. All Halon 1301 cylinders and agent removed from US Army vessels shall be turned in to the Defense Depot located in Richmond, VA by the contractor.

11.21.2 Turn-In Procedures

The contractor shall contact the Defense Depot, SW 400, Cylinder Operations, Richmond, VA 23297 to set up a delivery time and point of contact (POC). The contractor shall ensure quantity of agent, number of cylinders, size and weight of agent returned is accounted for on DD Form 1348, and ensure copies of signed receipts are provided to the COTR.

12.0 EMERGENCY RESPONSE AND CONTINGENCY

Emergency conditions that may be anticipated during work activities include:

- Fire involving combustible materials;
- Medical emergency due to heat stress, physical accident or exposure to toxic materials;
- Release of hazardous materials.

In the event of a release of hazardous materials or fire during installation, the HASP Manager will be the response manager and will determine the appropriate level of response.

12.1 Emergency Supplies

At a minimum, the following contractor provided supplies must be immediately available for on-site use:

- First Aid Equipment and Supplies;
- Spill Containment and Spill Adsorption Kit;
- Portable engine driven fire pump, 95 GPM @ 95 PSI (if not available on-board);
- Type ABC Fire extinguishers, 10 lb. capacity, minimum of two in each separate space during conduct of any hot work; and
- An emergency vehicle parked in immediate vicinity.

12.2 Contingency Plan Execution

In the event an emergency situation, employees shall follow the following procedures:

Identify to the appropriate response authority:

- Your name;
- Description of the emergency;

- Exact location of the emergency; and
- Any other pertinent information;

Upon discovering an emergency the following series of events will occur (not in order, depending on the situation):

- Notification of personnel;
- Stop work activities if necessary;
- Lower background noises; and
- Begin emergency procedures:
- Identify casualties and severity of injuries;
- Assess existing and potential hazards to site personnel and off-site populations;
- Request aid if necessary;
- Allocate resources;
- Extricate and stabilize victims;
- Evacuate if necessary.

12.3 Emergency Response and Support Numbers

Listings will be compiled during the site surveys of each home port. These listings will identify the emergency and non-emergency lines of communication (telephone numbers) for various response organizations. The format and content of the listing is identified by example in Appendix I.

This HASP is a living document, subject to change and revision as special circumstance and requirements are identified. As such, the HASP will be updated as necessary to include newly identified, or changed, emergency numbers, site maps, and procedures identified to improve upon the health and safety of all personnel.

12.4 Communications

Two sets of communication systems will be established; internal communication among personnel on-site, and external communication among on-site and off-site personnel.

Internal communication will be used to:

- Alert team members to emergencies;
- Maintain site control;
- Communicate changes in work to be accomplished to an emergency situation; and
- Pass along safety information, such as air change, amount of air time left before break, etc.

Visual signals will be used for communication during operations in high noise areas.

12.5 Emergency Recognition and Prevention

Emergency recognition and prevention training will be included in the daily Tailgate Safety Meetings. By discussing the tasks to be performed, time constraints, emergency procedures, and hazards that may be encountered, personnel should be alert to the dangers and potential emergencies.

12.6 Medical Treatment

The type and severity of the illness or injury will dictate the immediateness of response. The medical facility will be informed of the circumstances of injury or illness and a site representative will accompany the victim.

12.7 Documentation and Review

After the response, the Site Supervisor shall prepare an Accident Report and submit it to the Harbormaster, vessel master, and COTR within four (4) hours. It will include such things as a chronological history of the emergency, facts, actions, personnel present, and summary of injuries. The HASP Manager will conduct an accident investigation to determine cause and subsequent action.

13.0 Pollution

13.1 Definition

For the purpose of this document, pollution is defined as:

- Discharge of trash of any type into the water.
- Discharge of any liquid or solid pollutant into the water.
- Such pollutants which may, or does, leave a sheen on the surface of the water.

13.2 Prevention

Members of the Contractor Installation Team shall not willfully and/or knowingly:

- Discharge trash, of any type, into the water.
- Discharge liquid or solid materials, of any type, into the water.

13.3 Pollution Incident

In the event a pollution incident occurs, the following actions shall immediately be taken:

1. Secure source of pollution.
2. Notify Harbormaster and vessel Master of incident; Harbormaster's Office serves as Pollution Office for U.S. Army vessels.
3. Prepare and submit an Incident Report.

13.4 Equipment Required

The contractor shall have the following contractor provided equipment on-site at all times in order to handle hazardous material releases within the vessel space:

- Noncombustible absorbent;
- 5 gal. containers; and
- Shovel, broom, or other hand tools.

The contractor shall identify the locations of any onboard and/or shoreside government marine spill response equipment. If no equipment is readily available, the contractor shall have the appropriate equipment on-site (based on the types and quantities of hazardous materials used on site by the contractor) at all times in order to control potential spills off the vessel.

13.5 Contingency Plan

The following requirements will be met during a spill response action:

- Notify the Duty Officer, and Harbormasters Office immediately;
- Take immediate measures to control and contain the spill;
- Isolate and contain hazardous spill areas;
- Deny entry to unauthorized personnel;
- Do not allow anyone to touch spilled material;
- Stay upwind; keep out of low areas;
- Keep combustibles away from the spilled material;
- Use water spray to reduce vapors and dust, as needed;
- Take samples for analysis to determine that cleanup is adequate;
- If released from tanks, prevent discharge beyond site boundaries;
- Caution should be given (opening, sampling, and over packing) when handling drums and containers.

13.6 Notification of Spills and Discharges

The Site Supervisor shall provide telephonic or in person, notification of the incident immediately to the vessel Master, Harbormaster and COTR. The HASP Manager shall prepare an Incident Report that includes, but is not limited to, the following items:

- Description of material spilled, including identity if known, approximate quantity, and a copy of the waste disposal manifest if available;
- Exact time and location of the spill, and the description of the area involved;
- Containment procedures utilized;
- Description of the cleanup procedures employed at the site, including disposal of spill residue; and
- Summary of the communications the contractor has with other agencies.

14.0 LOGS, REPORTS, AND RECORD KEEPING

14.1 Exposure of Personnel

All injuries, incidents, and accidents will be reported promptly to the HASP Manager. Reportable incidents include, but are not limited to:

- Injuries to personnel resulting in lost time;
- Tool or equipment failure which results or could result in serious injury;
- Fire or explosion of any magnitude;
- Exposure of unprotected personnel to toxic agents and/or hazardous material;
- Vehicle accidents; and
- Any damage to Government or private property.

All injuries/illnesses, no matter how minor they appear, are to be reported to the HASP Manager. The HASP Manager shall ensure that the accident/incident is logged and properly reported.

Under no circumstances should an injured employee drive himself/herself to the hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The employee who transports the injured person should be trained in first aid and CPR whenever possible. In the event the injury is severe, or when in doubt of severity of injury, employee should be transported by ambulance.

Injured employees which require medical treatment or have been taken to a doctor, hospital, clinic, etc., should not be allowed to resume work without a written return to work or any work statement from the treating physician. This statement should give diagnosis, date of return to work and work limitations. Should a statement such as "light duty" be given, call the treating physician to determine the exact restriction that is needed. Be sure the treating physician understands the type of work the employee normally performs and that alternate work is available to meet work restrictions.

14.2 OSHA Recording Procedures

All injuries, no matter how minor they appear, are to be logged as required by OSHA. This provides a record per exposure limits and audits safety. Minor injuries such as small cuts, scrapes, small first degree burns, and splinters that require first aid treatment, are entered on this log only. Any incident that requires the completion of the Accident Investigation Report must be logged. Maintaining this log will help in meeting OSHA record keeping requirements and in responding to minor incidents before they become major. The original log should be retained in site records.

14.3 OSHA Records

The following records will be archived in the contractors permanent project files:

- Occupational Injuries and Illnesses - 5 years;
- Training (Hazardous Waste and Operations) - Current;
- Exposure Measurements (Hazardous Waste and Operations) - 30 years; and
- Medical Surveillance (Hazardous Waste) - 30 years.

APPENDICES

- APPENDIX A: CHARTS, ORGANIZATIONAL/CONTROL/COMMUNICATION**
- APPENDIX B: INCIDENT REPORT**
- APPENDIX C: INCIDENT REPORT/INVESTIGATION LOG**
- APPENDIX D: INCIDENT INVESTIGATION REPORT**
- APPENDIX E: ACCIDENT REPORT**
- APPENDIX F: ACCIDENT REPORT/INVESTIGATION LOG**
- APPENDIX G; ACCIDENT INVESTIGATION REPORT**
- APPENDIX H: ACTIVITY HAZARD ANALYSIS**
- APPENDIX I: SITE SPECIFIC EMERGENCY AND NON-EMERGENCY TELEPHONE NUMBERS AND EMERGENCY RESPOSE MAP**
- APPENDIX J: SHIPCHECK LISTING AND PRIMER**
- APPENDIX K: HASP COMPLIANCE AGREEMENT**
- APPENDIX L: TAILGATE SAFETY MEETING FORM**
- APPENDIX M: SAFETY INSPECTION REPORT**
- APPENDIX N: HAZARD COMMUNICATION PROGRAM**
- APPENDIX O: ON-SITE VISITOR INFORMATION FORM AND LOG**

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ACO	Administrative Contracting Officer
ANSI	American National Standards Institute
APR	Air Purifying Respirator
bpm	beats per minute (medical measurement)
CASCOM	US Army Combined Arms Service Command
CCR	California Code of Regulations
CC/IH	Certified Chemist/Industrial Hygienist
CFR	Code of Federal Regulations
CO	Contracting Officer
COTR	Contracting Officer's Technical Representative
CPR	CardioPulmonary Resuscitation
dBA	Decibel "A"(scale - acoustic)
DOT	Department of Transportation
FM	Field Manual
GFI	Ground Fault Interrupt
HAS	Health and Safety
HASO	Health And Safety Officer
HASP	Health And Safety Plan
HAST	Health And Safety Team
HEPA	High Efficiency Particulate Air (filter)
IDLH	Immediate Danger to Life and Health
IEEE	Institute of Electrical and Electronics Engineers
LEL	Lower Explosive Limit
LT	Large Tug
LCU-1600	Landing Craft, Utility, Design 1600
LCU-2000	Landing Craft, Utility, Design 2000
LSV	Logistics Support Vessel
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PM	Program/Project Manager
POC	Point Of Contact
PPE	Personal Protective Equipment
PPM	Parts Per Million
REL	Recommended Exposure Limits
RSPA	Research Special Programs Administration
SCBA	Self Contained Breathing Apparatus
SOLAS	Safety Of Life At Sea
SOW	Statement Of Work
STEL	Short Term Exposure Limits
SWL	Safe Working Load
TACOM	US Army Tank-Automotive and Armaments Command
TBMSO	Transportation Branch Marine Safety Office

TLV	Threshold Limit Value
TSF	Total Safety Focus
TSMO	Transportation Systems Management Office
TWA	Time Weighted Average
UL	Underwriters Laboratory
US	United States
WWS	Water Washdown System

Appendix A

CHART 1:

**ORGANIZATIONAL STRUCTURE
of the
HASP Team**

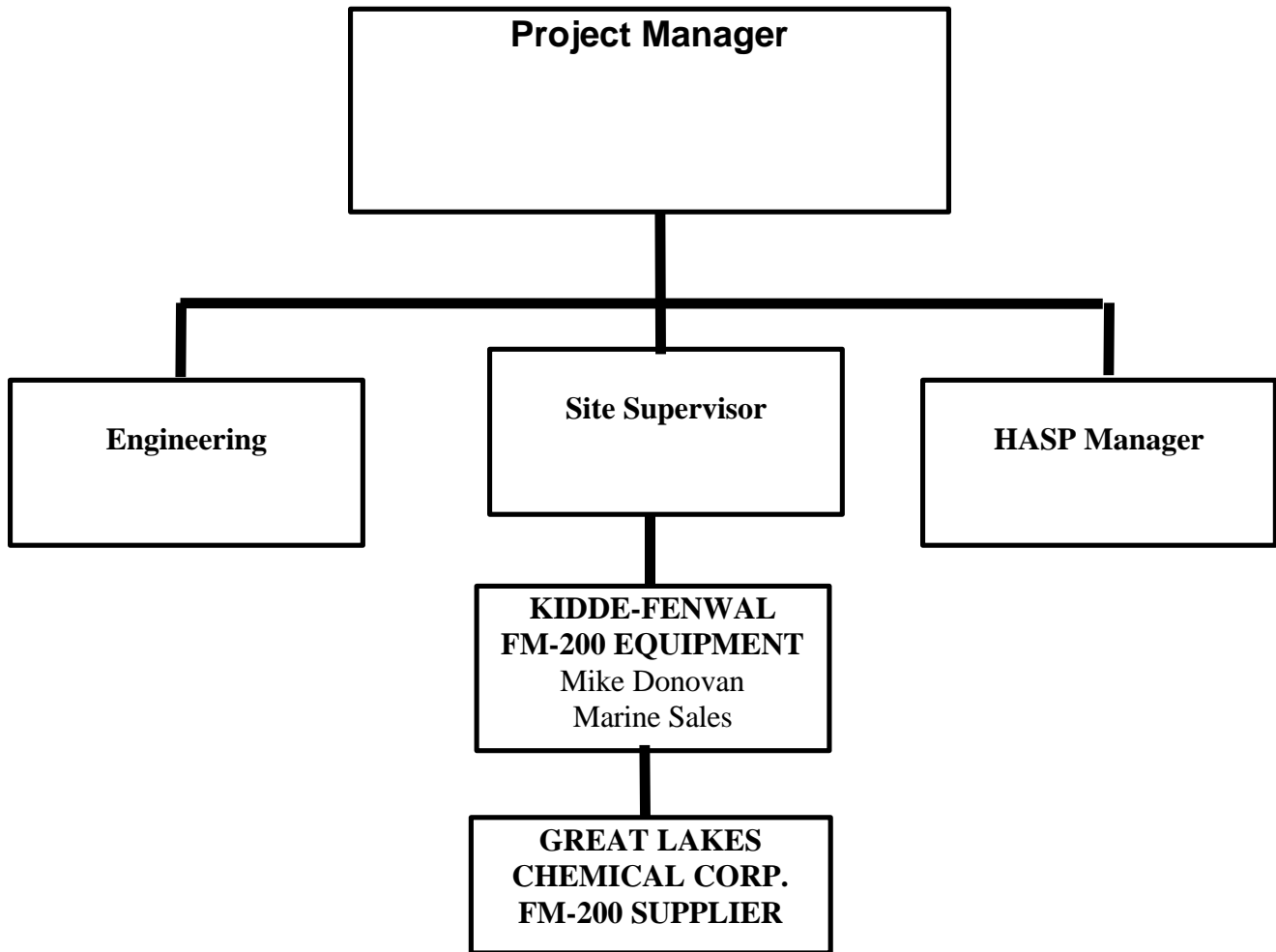


CHART 2:

CONTRACTUAL LINES OF CONTROL
for
REPLACEMENT OF
HALON TOTAL FLOODING SYSTEMS ONBOARD US ARMY WATERCRAFT

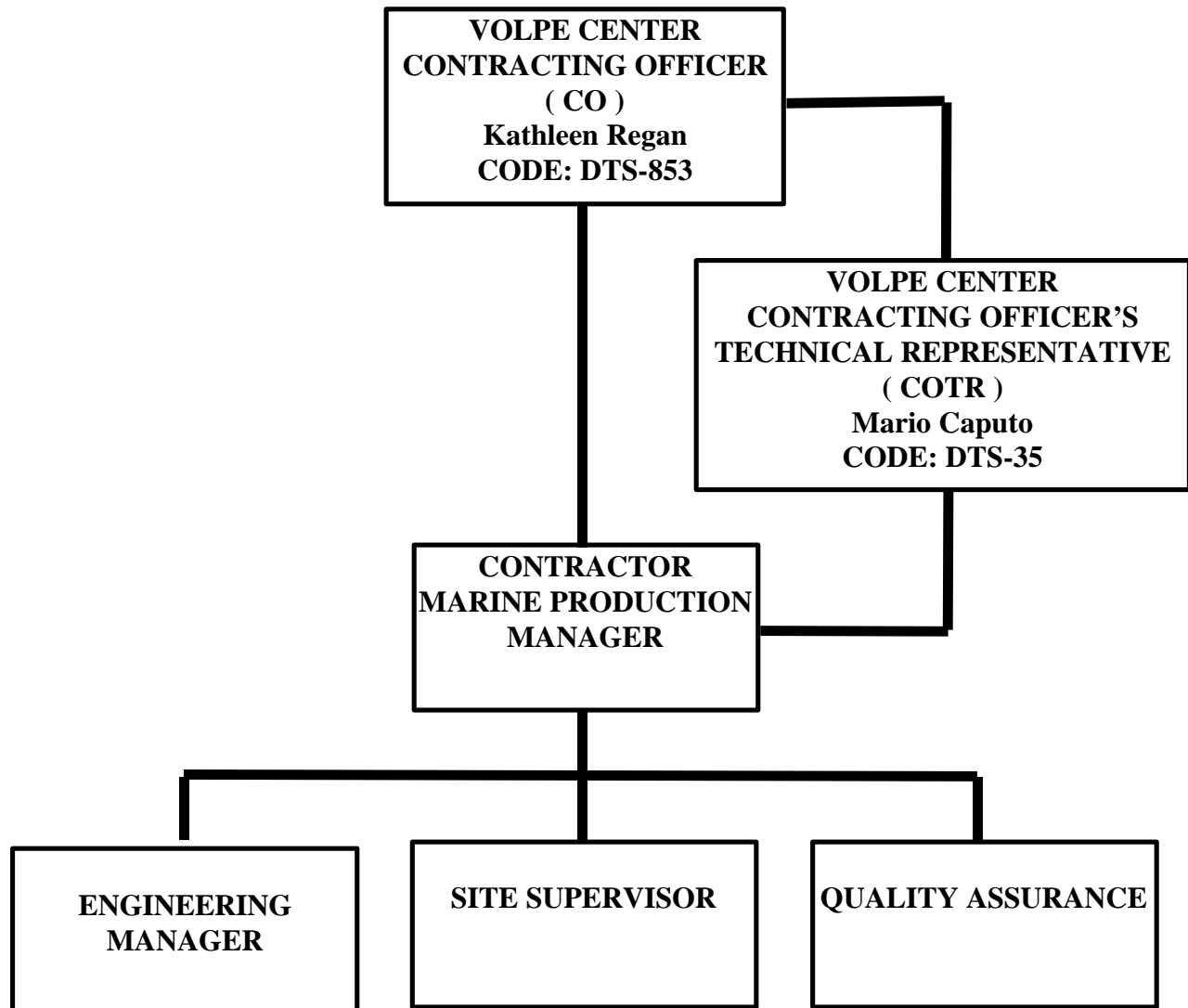


CHART 3:

KEY ORGANIZATIONS AND PERSONNEL
for
REPLACEMENT OF
HALON TOTAL FLOODING SYSTEMS ONBOARD US ARMY WATERCRAFT

U.S. ARMY

TACOM PROGRAM MANAGER	BOB MATUSEK	810-574-8844
TRANSPORTATION BRANCH	CHARLIE	
MARINE SAFETY OFFICER (TBMSO)	BREWSTER	757-878-1327

**VOLPE
CENTER**

CONTRACTING OFFICER (CO)	KATHLEEN REGAN	617-494-3485
PROGRAM MANAGER	MARK GENTILE	617-494-2233
CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR)	MARIO CAPUTO	617-494-2899
TECHNICAL ASSISTANTS	ROBERT PRAY	617-494-2233
	JULIE DEVINE	617-494-3127

**CONTRACT
TEAM**

TEAM PROGRAM MANAGER
ENGINEERING MANAGER
SITE SUPERVISOR
QA MANAGER

APPENDIX B

INCIDENT REPORT

INCIDENT REPORT

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

Company Name	Company Location	Job No.	Incident Report No. and Date
FACTS RELATING TO INCIDENT			
Date Incident Occurred	Time Incident Occurred	Date Incident Reported	Incident Reported By
Weather Conditions		Work Site/Area Conditions	
Superintendent	Foreman	HAST Asst. Mgr.	
DESCRIBE CLEARLY AND FULLY HOW INCIDENT OCCURRED (USE ADDITIONAL SHEET IF REQUIRED)			
DESCRIPTION AND LOCATION OF DAMAGED OR DESTROYED PROPERTY (MUST BE COMPLETE AND CONCISE)			
CUSTOMER PROPERTY:			
CONTRACTOR PROPERTY:			
Estimated Value of Damage or Destruction to Customer Property		Estimated Value of Damage or Destruction to Contractor Property	
CUSTOMER WITNESSES TO INCIDENT (USE ADDITIONAL SHEET IF REQUIRED)			
Full Name	Address	Work Phone Number	
1.)		()	
2.)		()	
3.)		()	
CONTRACTOR WITNESSES TO INCIDENT (USE ADDITIONAL SHEET IF REQUIRED)			
Full Name	Address	Home Phone Number	
1.)		()	
2.)		()	
3.)		()	
CUSTOMER PERSONNEL NOTIFIED (USE ADDITIONAL SHEET IF REQUIRED)			
Full Name	Address	Work Phone Number	Date and Time Notified
1.)		()	
2.)		()	
3.)		()	
CONTRACTOR PERSONNEL NOTIFIED (USE ADDITIONAL SHEET IF REQUIRED)			
Full Name	Address	Work Phone Number	Date and Time Notified
1.)		()	
2.)		()	
3.)		()	
Actions taken to prevent further occurrences:			
NOTE: IN THE EVENT OF INJURY TO PERSONNEL, CUSTOMER OR CONTRACTOR, AN ACCIDENT FORM MUST BE COMPLETED			
I affirm this Incident Report has been fully completed and represents all available information.			
Prepared By: _____		Signature _____ Date _____	
HAST Asst. Mgr _____		Signature _____ Date _____	

APPENDIX C

INCIDENT REPORT/INVESTIGATION LOG

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

[illegible]

APPENDIX D

INCIDENT INVESTIGATION REPORT

INCIDENT INVESTIGATION REPORT

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

Incident Report No. and Date	Inv. Report Prepared By	Date Prepared	Date Report Forwarded to HAST PM
DESCRIPTION AND LOCATION OF DAMAGED OR DESTROYED PROPERTY (MUST BE COMPLETE AND CONCISE)			
Customer Property:			
Contractor Property:			
Estimated Value of Damage or Destruction to Customer Property		Estimated Value of Damage or Destruction to Contractor Property	
DESCRIBE CLEARLY AND FULLY HOW INCIDENT OCCURRED (USE ADDITIONAL SHEET IF REQUIRED)			
FINDINGS OF INCIDENT INVESTIGATION (USE ADDITIONAL SHEET IF REQUIRED)			
ACTIONS TO BE TAKEN TO PREVENT REOCCURRENCE (USE ADDITIONAL SHEET IF REQUIRED)			
ACTIONS TAKEN			
Date HAST Asst. Mgrs. Briefed	Briefing Conducted By	Name of HAST Asst. Mgr.	
HAST Asst. Mgr 1:			
HAST Asst. Mgr 2:			
HAST Asst. Mgr 3:			
Date Installation Team 1 Briefed	Briefing Conducted By	Attendees (Attach Listing)	
Date installation Team 2 Briefed	Briefing Conducted By	Attendees (Attach Listing)	
Date Installation Team 3 Briefed	Briefing Conducted By	Attendees (Attach Listing)	
NOTE: IN THE EVENT OF INJURY TO PERSONNEL, CUSTOMER OR CONTRACTOR, AN ACCIDENT INVESTIGATION REPORT MUST BE COMPLETED			
I affirm this Incident Investigation Report has been fully completed, represents all available information, and recommended actions to prevent reoccurrence have been disseminated to all members of the HAST and Installation Teams.			
HAST Team Mgr. Signature _____			Date _____

APPENDIX E
ACCIDENT REPORT

ACCIDENT REPORT

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

Company Name			Company Location		Job No.	Accident Report No. and Date		
EMPLOYEE INFORMATION				FACTS RELATING TO ACCIDENT				
Last Name First Name Middle			Date of Accident		Time of Accident			
Address Street Apt No.			Date Accident Reported		Accident Report Prepared By			
City State Zip Code			Did Employee Stop Work		If YES, Date and Time			
Social Security Number		Date of Birth		Wages Paid for Day of Accident		If No, What Hour Paid Through		
Marital Status		No. of Dependents		Time Shift Started		Time Shift Ended		
Home Phone No. ()			How Long Employed		Full Description of Where Accident Occurred			
Employee No.			Date of Hire		Years of Experience			
INFORMATION RELATING TO ACCIDENT								
Weather Conditions				Work Site/Area Conditions				
OCCUPATION (CHECK ONE) <input type="checkbox"/> Superintendent <input type="checkbox"/> Foreman <input type="checkbox"/> Safety Engineer Tech <input type="checkbox"/> Welder <input type="checkbox"/> Loadman <input type="checkbox"/> Electrical Tech <input type="checkbox"/> Mechanic 1st Class <input type="checkbox"/> Mechanic 2nd Class <input type="checkbox"/> Safety Tech <input type="checkbox"/> Apprentice <input type="checkbox"/> Warehouseman <input type="checkbox"/> Helper			LOCATION <input type="checkbox"/> Decks <input type="checkbox"/> Below Decks <input type="checkbox"/> Ladderway <input type="checkbox"/> Warehouse <input type="checkbox"/> Pier <input type="checkbox"/> Office/Shop <input type="checkbox"/> Highway <input type="checkbox"/> Oil Rig <input type="checkbox"/> Comm. Bldg. <input type="checkbox"/> Plant <input type="checkbox"/> Other		EQUIPMENT <input type="checkbox"/> Forklift <input type="checkbox"/> Drill Motor <input type="checkbox"/> Grinder <input type="checkbox"/> Blastrac <input type="checkbox"/> Welding <input type="checkbox"/> Cutting Torch <input type="checkbox"/> Pipe Thread <input type="checkbox"/> Machine <input type="checkbox"/> Knife <input type="checkbox"/> Truck <input type="checkbox"/> Crane <input type="checkbox"/> Cylinder <input type="checkbox"/> Move/Repair		DISPOSITION <input type="checkbox"/> Doctors Office <input type="checkbox"/> Hospital <input type="checkbox"/> On-Site First Aid Only <input type="checkbox"/> Reported for Record Only <input type="checkbox"/> Other (Specify) _____ _____ _____ Injury Previously Reported? _____ To Whom _____ Date _____	
WITNESSES TO ACCIDENT AND/OR OTHER CREW (USE ADDITIONAL SHEET IF REQUIRED)								
Full Name		Address			Home Phone Number			
1.)					()			
2.)					()			
3.)					()			
Superintendent		Foreman			HAST Asst. Mgr.			
Name and Location of Doctor/Hospital					Did Employees Choose this Doctor/Hospital?			
DESCRIBE CLEARLY AND FULLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET IF REQUIRED)								
(To be completed by employee, if possible)								
List Every Body Part Alleged to be Injured and Describe Nature of Injury.								
Did employee return to work?		When?		Any Restrictions? (Describe)		Duration of Restriction(s)		
Actions taken to prevent further occurrences:								
NOTE: IN THE EVENT CUSTOMER OR CONTRACTOR PROPERTY IS DAMAGED OR DESTROYED, AN HSI INCIDENT REPORT MUST BE COMPLETED								
I certify and affirm that I have read this Accident Report and that it is a true and correct description of the accident in which I was injured. I am aware of the penalties for making a false or misleading statement on this Accident Report for the purpose of obtaining Workman's Compensation Benefits (\$1,000 fine and/or 1 year imprisonment.								
Employee Signature _____						Date _____		
HAST Asst. Mgr Signature _____						Date _____		

APPENDIX F

ACCIDENT REPORT/INVESTIGATION LOG
US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

REPORT NUMBER	DATE ACCIDENT OCCURRED	DATE AND TIME HAST PM NOTIFIED	DATE AND TIME REPORT TO HAST PM	DATE ACCIDENT INV. INITIATED	DATE ACCIDENT INV. COMPLETED	ACTIONS TO PREVENT REOCCURRENCE	DATE INV. REPORT TO HAST PM

APPENDIX G

ACCIDENT INVESTIGATION REPORT

ACCIDENT INVESTIGATION REPORT

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

Accident Report No. and Date	Accident Report Prepared By	Date Prepared	Date Report Forwarded to HAST PM
DESCRIPTION OF INJURY (MUST BE COMPLETE AND CONCISE)			
Customer Personnel:			
Contractor Personnel:			
DESCRIBE CLEARLY AND FULLY HOW ACCIDENT OCCURRED (USE ADDITIONAL SHEET IF REQUIRED)			
FINDINGS OF ACCIDENT INVESTIGATION (USE ADDITIONAL SHEET IF REQUIRED)			
ACTIONS TO BE TAKEN TO PREVENT REOCCURRENCE (USE ADDITIONAL SHEET IF REQUIRED)			
ACTIONS TAKEN			
Date HAST Asst. Mgrs. Briefed	Briefing Conducted By	Name of HAST Asst. Mgr.	
HAST Asst. Mgr 1:			
HAST Asst. Mgr 2:			
HAST Asst. Mgr 3:			
Date Installation Team 1 Briefed	Briefing Conducted By	Attendees (Attach Listing)	
Date installation Team 2 Briefed	Briefing Conducted By	Attendees (Attach Listing)	
Date Installation Team 3 Briefed	Briefing Conducted By	Attendees (Attach Listing)	
NOTE: IN THE EVENT OF DAMAGE TO CUSTOMER OR CONTRACTOR PROPERTY, AN INCIDENT INVESTIGATION REPORT MUST BE COMPLETED			
I affirm this Accident Investigation Report has been fully completed, represents all available information, and recommended actions to prevent reoccurrence have been disseminated to all members of the HAST and Installation Teams.			
HAST Team Mgr. Signature _____			Date _____

APPENDIX H

ACTIVITY HAZARD ANALYSIS

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Mobilization, General Conduct, Demobilization
 LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Operating Motor Vehicles For Personnel Transport	Passenger Vehicle	Careless Driving	Discuss driver safety and site regulations at tailgate safety meeting.
		Improper Maintenance	Verify rental vehicle safety inspections and return vehicle if found inadequate. Verify Vehicle inspections performed competent person/organization per approved schedule.
		Collisions / Accidents	Caution should be used at all times in and around the use of vehicles and equipment. Operators should slow down and cautiously approach blind intersections and crossings when visibility is limited or when passing work crews or pedestrians.
Operating Motor Vehicles For Transport Of Materials, Equipment, Or Components To, From, Or On-Site.	Transport Vehicle (Cargo Truck, Van, Sport Utility Vehicle)	Careless Driving	Discuss driver safety at tailgate safety meeting. Caution should be used at all times in and around the use of vehicles and equipment. Operators should slow down and cautiously approach blind intersections and crossings when visibility is limited or when passing work crews or pedestrians
		Improper Maintenance	Verify Transport Vehicle inspections performed by Competent Personnel per approved schedule.
		Collisions / Accidents	All necessary back-up precautions will be utilized such as clearing a path, using audible back up alarms, and/or installing someone to guide the truck safely backwards.

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Mobilization, General Conduct, Demobilization

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Operating Heavy Material Handling Equipment On-site	Material Handling Equipment (MHE) such as cranes, forklifts, portable conveyors and lifts, powered jacks, etc.)	Careless operation	Discuss operator safety and site regulations at tailgate safety meeting. Discuss use of MHE with relation to Installation Team requirements for use of MHE. Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the movement or transport of material, equipment, or components through or over a work area. Do not operate partially guarded MHE. Allow only trained and certified operators to use the MHE
		Improper Maintenance	Verify the performance and adequacy of equipment maintenance and safety inspections and scheduling. Perform safety and fluids inspection before each use. If found inadequate, notify HASO.
		Accident	All necessary precautions will be utilized such as clearing a path, using audible operating/motion alarms, and/or installing someone to guide the operations and direction of movement. All necessary movement precautions will be utilized such as pre-planning of all heavy MHE activity, avoiding operation near or under power lines and areas where capacities are not marked, clearing a path, using audible back up alarms, and/or installing someone to guide the operation and prevent unintended entry of personnel during the movement.

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of vessel(s)
 LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Cutting and/or disassembly of piping, valves, pressure devices, nozzles and related material.	a.) Various sized wrenches, sockets, drives, pliers, punches, hammers, screw drivers and similar hand tools, clamps and braces, hand and power hacksaw, pipe cutter, oxy-acetylene torch set, drill motor and drill bits, abrasive power saw, grinder, etc. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, welding goggles or helmet, work and welding gloves, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Spill of potential pollutant c.) Damage to Government Equipment d.) Loss of life e.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. b.) Identify and disable (lockout and Tagout) operating machinery. c.) protect immovable machinery and equipment to prevent damage. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the use of portable machine tools and flame cutting. Post Fire Watch. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel, not permitting ill personnel to perform potentially hazardous tasks without medical release. g.) Inspect all hand tools and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. h.) Establish Safe For Men - Safe For Hot Work zone

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Cutting temporary access ways to permit access/egress of material, equipment, and componentry.	<p>a.) Various punches, hammers, and similar hand tools, clamps and braces, hand and power hacksaw, pipe cutter, oxy-acetylene torch set, drill motor and drill bits, grinder, etc.</p> <p>b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, welding goggles or helmet, work and welding gloves, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.</p>	<p>a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains.</p> <p>b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc.</p> <p>c.) Fire or explosion</p> <p>d.) Spill of potential pollutant</p> <p>c.) Damage to Government Equipment</p> <p>d.) Loss of life</p> <p>e.) Equipment Loss</p>	<p>a.) Discuss equipment safety and proper tool use at tailgate safety meeting.</p> <p>b.) Identify and disable (lockout and Tagout) operating machinery.</p> <p>c.) protect immovable machinery and equipment as necessary to prevent damage.</p> <p>d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the use of portable machine tools and flame cutting. Post Fire Watch.</p> <p>e.) Verify use of PPE and special safety equipment.</p> <p>f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.</p> <p>g.) Inspect all hand tools and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.</p> <p>h.) Establish Safe For Men - Safe For Hot Work zone</p>

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Entry into and cutting and/or disassembly of piping, valves, pressure devices, nozzles and related system components within a <u>Confined Space</u> .	<p>a.) Various sized wrenches, sockets, drives, pliers, punches, hammers, screw drivers and similar hand tools, clamps and braces, hand and power hacksaw, pipe cutter, oxy-acetylene torch set, drill motor and drill bits, abrasive power saw, grinder, etc.</p> <p>b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, welding goggles or helmet, work and welding gloves, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks</p> <p>c.) Special equipment including full body harness, retrieval system w/tripod (optional - space dependent), ventilation blower and ducting</p>	<p>a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains.</p> <p>b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc.</p> <p>c.) Fire or explosion</p> <p>d.) Spill of potential pollutant</p> <p>c.) Damage to Government Equipment</p> <p>d.) Loss of life</p> <p>e.) Equipment Loss</p>	<p>a.) Discuss equipment safety and proper tool use at tailgate safety meeting.</p> <p>b.) Identify and disable (lockout and Tagout) operating machinery.</p> <p>c.) protect immovable machinery and equipment as necessary to prevent damage.</p> <p>d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the use of portable machine tools and flame cutting. Post Fire Watch.</p> <p>e.) Verify use of PPE and special safety equipment.</p> <p>f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.</p> <p>g.) Inspect all hand tools and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.</p> <p>h.) Establish Safe For Men - Safe For Hot Work zone</p>

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Cutting and/or disassembly of <u>elevated</u> piping, valves, pressure devices, nozzles and related material.	<p>a.) Various sized wrenches, sockets, drives, pliers, punches, hammers, screw drivers and similar hand tools, clamps and braces, hand and power hacksaw, pipe cutter, oxy-acetylene torch set, drill motor and drill bits, abrasive power saw, grinder, etc.</p> <p>b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, welding goggles or helmet, work and welding gloves, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.</p> <p>c.) Special equipment including ladders, scaffolding, manlifts, elevated platforms, lifelines and lanyards, body harness.</p>	<p>a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains.</p> <p>b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc.</p> <p>c.) Fire or explosion</p> <p>d.) Spill of potential pollutant</p> <p>c.) Damage to Government Equipment</p> <p>d.) Loss of life</p> <p>e.) Equipment Loss</p>	<p>a.) Discuss equipment safety and proper tool use at tailgate safety meeting.</p> <p>b.) Identify and disable (lockout and Tagout) operating machinery.</p> <p>c.) protect immovable machinery and equipment as necessary to prevent damage.</p> <p>d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the use of portable machine tools and flame cutting. Post Fire Watch.</p> <p>e.) Verify use of PPE and special safety equipment.</p> <p>f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.</p> <p>g.) Inspect all hand tools and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.</p> <p>h.) Establish Safe For Men - Safe For Hot Work zone</p>

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Movement of disassembled system equipment, components, and/or used material to temporary storage.	<p>a.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, welding goggles or helmet, work and welding gloves, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.</p> <p>b.) Material Handling and Temporary Storage Equipment including Safety Cans for solid waste, Trash receptacles and dumpsters, temporary storage lockers, drum carriers, hand trucks, dollies, platform trucks, carts, reusable or disposable pallets, tilt trucks, bags and liners.</p>	<p>a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains.</p> <p>b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc.</p> <p>c.) Fire or explosion</p> <p>d.) Spill of potential pollutant</p> <p>c.) Damage to Government Equipment</p> <p>d.) Loss of life</p> <p>e.) Equipment Loss</p>	<p>a.) Discuss equipment safety and proper tool use at tailgate safety meeting.</p> <p>b.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the use of portable machine tools and flame cutting. Post Fire Watch.</p> <p>c.) Verify use of PPE and special safety equipment.</p> <p>d.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.</p> <p>e.) Inspect all hand tools and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.</p>

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of vessel(s)
 LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Disassembly, unsecuring, and transport of Halon pressurized containers of various size and configuration.	a.) Various sized wrenches, sockets, drives, pliers, punches, hammers, screw drivers and similar hand tools, clamps and braces, hand and power hacksaw, pipe cutter, oxy-acetylene torch set, drill motor and drill bits, abrasive power saw, grinder, etc. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, welding goggles or helmet, work and welding gloves, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks c.) Material Handling and Temporary Storage Equipment including, temporary secure storage lockers, drum/cylinder carriers, hand trucks, dollies, platform trucks, carts, reusable or disposable pallets, air cylinder safety caps/guards, mobile and/or portable lifting equipment, and safety straps	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Spill of potential pollutant c.) Damage to Government Equipment d.) Loss of life e.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. b.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the use of portable machine tools and flame cutting. Post Fire Watch. c.) Verify use of PPE and special safety equipment. d.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. e.) Inspect all hand tools and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Installation and/or assembly of FM-200 and Water Washdown System pre-sized piping, valves, pressure devices, nozzles and related material.	Identical to the Requirements analysis of "Cutting and/or disassembly of piping, valves, pressure devices, nozzles and related material" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Potential Hazards analysis of "Cutting and/or disassembly of piping, valves, pressure devices, nozzles and related material" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Control Measures of "Cutting and/or disassembly of piping, valves, pressure devices, nozzles and related material" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity
Installation and/or assembly of FM-200 and Water Washdown System <u>elevated</u> pre-sized piping, valves, pressure devices, nozzles and related material.	Identical to the Requirements analysis of "Cutting and/or disassembly of elevated piping, valves, pressure devices, nozzles and related material" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Potential Hazards analysis of "Cutting and/or disassembly of elevated piping, valves, pressure devices, nozzles and related material" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Control Methods of "Cutting and/or disassembly of elevated piping, valves, pressure devices, nozzles and related material" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Entry into and installation and/or assembly of pre-sized piping, valves, pressure devices, nozzles and related material. within a <u>Confined Space</u> .	Identical to the Requirements analysis of "Entry into and cutting and/or disassembly of piping, valves, pressure devices, nozzles, and related system components within a Confined Space" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Potential Hazards analysis of "Entry into and cutting and/or disassembly of piping, valves, pressure devices, nozzles, and related system components within a Confined Space" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Control Measures of "Entry into and cutting and/or disassembly of piping, valves, pressure devices, nozzles, and related system components within a Confined Space" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity
Movement of equipment, components, and/or material from temporary storage to the point of use.	Identical to the Requirements analysis of "Movement of disassembled system equipment, components, and/or used material to temporary storage" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Potential Hazards analysis of "Movement of disassembled system equipment, components, and/or used material to temporary storage" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity	Identical to the Control Measures of "Movement of disassembled system equipment, components, and/or used material to temporary storage" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity
Welding and semi-permanent pre-assembly of system components and subassemblies performed on-site.	Identical to the Requirements analysis of "Cutting temporary access ways to permit access/egress of material, equipment, and componentry" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity with addition of welder, welder helmet, gloves and vest or apron.	Identical to the Potential Hazards analysis of "Cutting temporary access ways to permit access/egress of material, equipment, and componentry" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.	Identical to the Control Measures of "Cutting temporary access ways to permit access/egress of material, equipment, and componentry" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.

Continued

HEALTH AND SAFETY PLAN (HASP) ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Transport, assembly in-place, and securing, of FM-200 pressurized containers of various size and configuration.	Identical to the Requirements analysis of "Disassembly, unsecuring, and transport of Halon pressurized containers of various size and configuration" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.	Identical to the Potential Hazards analysis of "Disassembly, unsecuring, and transport of Halon pressurized containers of various size and configuration" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.	Identical to the Control Methods of "Disassembly, unsecuring, and transport of Halon pressurized containers of various size and configuration" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.
Welding and permanent closure of temporary apertures and access ways	Identical to the Requirements analysis of "Cutting temporary access ways to permit access/egress of material, equipment, and componentry" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity with addition of Heliarc welder, welder helmet, gloves and vest or apron.	Identical to the Potential Hazards analysis of "Cutting temporary access ways to permit access/egress of material, equipment, and componentry" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.	Identical to the Control Measures of "Cutting temporary access ways to permit access/egress of material, equipment, and componentry" as presented for the "Disassembly of Halon Total Flooding Fire Extinguishing System, Demolition and Modification of Vessels" activity.

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and verification of installed FM-200 system components, devices and material. (Hydrostatic Testing of Piping, Elbows and related fluid flow components)	a.) Potable Water Source, Fittings, Hoses and Temporary Piping for Hook-up. b.) Compressed Gas Source, Regulator, Fittings, Adapters, Hoses and Temporary Piping for Piping Blow-Down and Fluid Evacuation. General Tools For Fastening Temporary Components. Leak Detection Fluid (optional) c.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. d.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Minor Compartment/Space flooding e.) Damage to Government Equipment f.) Loss of life g.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. b.) Identify and disable (lockout and Tagout) operating machinery. c.) Protect immovable machinery and equipment as necessary to prevent damage. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. g.) Inspect all testing components and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and Verification of Vessel Venting and Machinery Automatic Shutdown Operation.	a.) Operation of FM-200 Fire Extinguishing System Installed Pressure Switch. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. c.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Damage to Government Equipment e.) Loss of life f.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations directly subject to the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. g.) Inspect all testing components and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and Verification of Manual Ventilation Closure(s) and Newly Installed Seals.	a.) Manual Operation of Manual Ventilation Closure(s) and Newly Installed Seals. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. b.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, etc.	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations directly subject to the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.
Test and Verification of Fire Extinguishing System Audible and Visual Alarms.	a.) Operation of FM-200 Fire Extinguishing System Installed Pressure Switch. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, etc.	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations directly subject to the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Installation of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)

LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and verification of installed Water Washdown System components, devices and material. (Hydrostatic Testing of Piping, Elbows and related fluid flow components).	a.) Potable Water Source, Fittings, Hoses and Temporary Piping for Hook-up. Compressed Gas Source, Regulator, Fittings, Adapters, Hoses and Temporary Piping for Piping Blow-Down and Fluid Evacuation. General Tools For Fastening Temporary Components. Leak Detection Fluid (optional) b.) Manual Operation of Manual Ventilation Closure(s) and Newly Installed Seals. c.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. d.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Minor Compartment/Space flooding e.) Damage to Government Equipment f.) Loss of life g.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. b.) Identify and disable (lockout and Tagout) operating machinery. c.) Protect immovable machinery and equipment as necessary to prevent damage. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. g.) Inspect all testing components and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS

ACTIVITY: First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)
 LOCATION: Fort Eustis, VA (onboard Vessels LT-801, LSU-1, LCU-1675, and LCU-2034)

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and verification of installed FM-200 system components, devices and material. (Hydrostatic Testing of Piping, Elbows and related fluid flow components)	a.) Potable Water Source, Fittings, Hoses and Temporary Piping for Hook-up. b.) Compressed Gas Source, Regulator, Fittings, Adapters, Hoses and Temporary Piping for Piping Blow-Down and Fluid Evacuation. General Tools For Fastening Temporary Components. Leak Detection Fluid (optional) c.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. d.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Minor Compartment/Space flooding e.) Damage to Government Equipment f.) Loss of life g.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. b.) Identify and disable (lockout and Tagout) operating machinery. c.) Protect immovable machinery and equipment as necessary to prevent damage. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations placed in danger by the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. g.) Inspect all testing components and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.

Continued

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)
 LOCATION: Fort Eustis, VA (onboard Vessels LT-801, LSU-1, LCU-1675, and LCU-2034)

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and Verification of Vessel Venting and Machinery Automatic Shutdown Operation.	a.) Operation of FM-200 Fire Extinguishing System Installed Pressure Switch. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. c.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, poisonous snake bites, etc. c.) Fire or explosion d.) Damage to Government Equipment e.) Loss of life f.) Equipment Loss	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations directly subject to the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. g.) Inspect all testing components and powered equipment prior to use. Perform safety and fluids inspection before each use. If found unsafe or inadequate, notify HASO. Do not use faulty, damaged, or degraded tools.

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)
 LOCATION: Fort Eustis, VA (onboard Vessels LT-801, LSU-1, LCU-1675, and LCU-2034)

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and Verification of Manual Ventilation Closure(s) and Newly Installed Seals.	a.) Manual Operation of Manual Ventilation Closure(s) and Newly Installed Seals. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks. b.) Equipment to permit visual access and adjustment including Ladders and Platforms, Safety Belts	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, etc.	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations directly subject to the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.
Test and Verification of Fire Extinguishing System Audible and Visual Alarms.	a.) Operation of FM-200 Fire Extinguishing System Installed Pressure Switch. b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.	a.) Occupational Injury including cuts, scrapes, abrasions, bruises, first and second degree burns, minor electric shock, insect bites, strains and sprains. b.) Severe personal injury requiring trained medical aid, including third degree burns, broken appendages, "stab" wounds and punctures, shock, electrocution, respiratory arrest, heart failure, stroke, severed appendages, etc.	a.) Discuss equipment safety and proper tool use at tailgate safety meeting. d.) Where necessary, post warnings, assign personnel and temporarily suspend operations directly subject to the Test. e.) Verify use of PPE and special safety equipment. f.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Site Survey and Vessel Shipcheck
 LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Conduct home port facility Site Survey for the purpose of identifying: assets; temporary billets; routes of entry; transportation; emergency response organizations; port, local, state, and Federal requirements and prohibitions.	Laptop Personal Computer (optional) for entry of data; Record log, maps and similar references	a.) Occupational Illness and/or injury associated with unfamiliar surrounds including, but not limited to, minor cuts, bruises, scrapes, abrasions, insect bites, skin irritation, and burns. b.) Severe personal injury requiring trained medical aid including, but not limited to, third degree burns, broken bones, severed appendages, stab wounds and punctures, electrocution, respiratory arrest, heart failure, stroke, and poisoning. c.) Loss of life	a.) Discuss and exercise heightened awareness of surroundings and potential dangers. b.) Familiarize personnel with laws, regulations and procedures associated with, and peculiar to, the site. c.) Urge all personnel to have regular physical check-ups. d.) Prohibit ill personnel from participating in activities that require full attention, especially operation of equipment and motor vehicles or maintenance of balance at extreme heights. d.) Mandate drug awareness and side effects of prescription drugs

HEALTH AND SAFETY PLAN (HASP) ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Site Survey and Vessel Shipcheck
LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Vessel boarding for the purpose of verification of existing Halon system design and audit of effected spaces.	Vessel secured pierside or dockside with gangway in place	a.) Occupational Illness and/or injury associated with unfamiliar surrounds including, but not limited to, minor cuts, bruises, scrapes, abrasions, insect bites, skin irritation, and burns. b.) Severe personal injury requiring trained medical aid including, but not limited to, third degree burns, broken bones, severed appendages, stab wounds and punctures, electrocution, respiratory arrest, heart failure, stroke, and poisoning. c.) Loss of life d.) Falls	a.) Discuss and exercise heightened awareness of surroundings and potential dangers. b.) Familiarize personnel with laws, regulations and procedures associated with, and peculiar to, the site and vessel. c.) Urge all personnel to have regular physical check-ups. d.) Prohibit ill personnel from participating in activities that require full attention, especially operation of equipment and motor vehicles or maintenance of balance at extreme heights. d.) Mandate drug awareness and side effects of prescription drugs. e.) Verify Gangway security and capacity. f.) Awareness of weather and sea-state

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Site Survey and Vessel Shipcheck
 LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Entry into Confined Spaces for the purpose of verification of existing system design.	a.) Various inspection and measurement devices, including: 100" Measuring Tape; Level; Flammable Vapor Detector (sniffer); Noise-Sound Level Meter; Flashlight; and Fluids Sampling Kit; b.) PPE including Body Harness and Retrieval System; Hard-hat, Gloves;, Steel Toed Shoes, Ventilation Blower and Ducting or SCBA	a.) Occupational Illness and/or injury associated with unfamiliar surrounds including, but not limited to, minor cuts, bruises, scrapes, abrasions, insect bites, skin irritation, and burns. b.) Severe personal injury requiring trained medical aid including, but not limited to, third degree burns, broken bones, severed appendages, stab wounds and punctures, electrocution, respiratory arrest, heart failure, stroke, and poisoning. c.) Loss of life d.) Falls e.) Entrapment	a.) Discuss equipment safety and proper tool use with inspect team prior to vessel boarding and the performance of inspection and verification activities related to all spaces b.) Employ the "Buddy System" whenever entering Confined Spaces. c.) Verify serviceability of PPE and special safety equipment. d.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. e.) Examine all inspection devices and equipment prior to use.

HEALTH AND SAFETY PLAN (HASP) ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: Site Survey and Vessel Shipcheck
LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED TO PERFORM REQUIREMENT:	POTENTIAL HAZARD:	CONTROL MEASURES
Compartment entry for the purpose of determining atmospheric content and toxicity.	a.) Various inspection and measurement devices, including: 100" Measuring Tape; Level; Flammable Vapor Detector (sniffer); Noise-Sound Level Meter; Flashlight; Fluids Sampling Kit; b.) PPE including Body Harness and Retrieval System; Hard-hat, Gloves, Steel Toed Shoes, Ventilation Blower and Ducting or SCBA	a.) Occupational Illness and/or injury associated with unfamiliar surrounds including, but not limited to, minor cuts, bruises, scrapes, abrasions, insect bites, skin irritation, and burns. b.) Severe personal injury requiring trained medical aid including, but not limited to, third degree burns, broken bones, severed appendages, stab wounds and punctures, electrocution, respiratory arrest, heart failure, stroke, and poisoning. c.) Loss of life d.) Fire or explosion e.) Equipment damage	a.) Discuss equipment safety and proper tool use with inspect team prior to vessel boarding and the performance of inspection and verification activities related to all spaces b.) Employ the "Buddy System" whenever entering suspect Spaces. c.) Verify serviceability of PPE and special safety equipment. d.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release. e.) Examine all inspection devices and equipment prior to use. f.) Mandate use of PPE

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS

ACTIVITY: First Article Cold Agent Discharge Testing

LOCATION: Fort Eustis, VA (onboard Vessels LT-801, LSU-1, LCU-1675, and LCU-2034)

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES
Test and Verification of Vessel Venting and Machinery Automatic Shutdown Operation.	Identical to the Requirements analysis of "Test and Verification of Vessel Venting and Machinery Automatic Shutdown Operation" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.	Identical to the Requirements analysis of "Test and Verification of Vessel Venting and Machinery Automatic Shutdown Operation" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.	Identical to the Requirements analysis of "Test and Verification of Vessel Venting and Machinery Automatic Shutdown Operation" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.
Test and Verification of Manual Ventilation Closure(s) and Newly Installed Seals.	Identical to the Requirements analysis of "Test and Verification of Manual Ventilation Closure(s) and Newly Installed Seals" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.	Identical to the Requirements analysis of "Test and Verification of Manual Ventilation Closure(s) and Newly Installed Seals" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.	Identical to the Requirements analysis of "Test and Verification of Manual Ventilation Closure(s) and Newly Installed Seals" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.

HEALTH AND SAFETY PLAN (HASP)

ACTIVITY HAZARD ANALYSIS CONTINUATION SHEET

ACTIVITY: First Article Cold Agent Discharge Testing

LOCATION: Fort Eustis, VA (onboard Vessels LT-801, LSU-1, LCU-1675, and LCU-2034)

Test and Verification of Fire Extinguishing System Audible and Visual Alarms.	Identical to the Requirements analysis of "Test and Verification of Fire Extinguishing System Audible and Visual Alarms" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.	Identical to the Requirements analysis of "Test and Verification of Fire Extinguishing System Audible and Visual Alarms" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.	Identical to the Requirements analysis of "Test and Verification of Fire Extinguishing System Audible and Visual Alarms" as presented for the "First Article Test and Acceptance of FM-200 Total Flooding Fire Extinguishing System and Water Washdown System onboard vessel(s)" activity.
Discharge of FM-200 System Below Main Deck to Verify Discharge Time, Hold Time, and Concentration Levels.	<p>a.) Fully operational and installed Fire Extinguishing System including FM-200 pressurized cylinders.</p> <p>b.) Personal Protective Equipment including back supports, safety helmet, eye protection, safety steel toed shoes or boots, correctly sized uniform, knee and elbow pads, ear plugs or earmuffs, dust and particulate matter masks.</p> <p>d.) Test equipment as specified in the Cold Agent Discharge Plan including devices that monitor agent concentration, coverage, time to dispersal, etc.</p>	<p>a.) Occupational Illness and/or injury associated with unfamiliar surrounds including, but not limited to, minor cuts, bruises, scrapes, abrasions, insect bites, skin irritation, and burns.</p> <p>b.) Severe personal injury requiring trained medical aid including, but not limited to, third degree burns, broken bones, severed appendages, stab wounds and punctures, electrocution, respiratory arrest, heart failure, stroke, and poisoning.</p>	<p>a.) Discuss equipment safety and proper tool use with inspect team prior to vessel boarding and the performance of inspection and verification activities related to all spaces</p> <p>b.) Ensure the crew of the vessel, as well as port authority, is aware of the performance of testing.</p> <p>c.) Verify serviceability of PPE and special safety equipment.</p> <p>d.) Monitor health and well being of personnel. Not permitting ill personnel to perform potentially hazardous tasks without medical release.</p> <p>e.) Examine all inspection devices and equipment prior to use.</p> <p>f.) Mandate use of PPE</p> <p>g.) Examine and clear all spaces of personnel and set watches or locks space accesses until after test completion</p>

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM
HEALTH AND SAFETY PLAN (HASP)
ACTIVITY HAZARD ANALYSIS

ACTIVITY:
LOCATION: Homeport Facilities, Various Points

PROCESS, TASK, OPERATION PERFORMED:	EQUIPMENT REQUIRED:	POTENTIAL HAZARD:	CONTROL MEASURES

APPENDIX I

HEALTH AND SAFETY PLAN

SITE SPECIFIC EMERGENCY AND

NON-EMERGENCY TELEPHONE NUMBERS

and

SITE MAP

**HEALTH AND SAFETY PLAN (HASP)
SITE SPECIFIC EMERGENCY AND
NON-EMERGENCY TELEPHONE NUMBERS**

FOR:

ORGANIZATION	TELEPHONE NUMBERS
FIRE DEPARTMENT,	EMERGENCY: 911 NON-EMERGENCY:
AMBULANCE,	EMERGENCY: 911 NON-EMERGENCY:
POLICE,	EMERGENCY: 911 NON-EMERGENCY:
US COAST GUARD, POLLUTION REPORTS	EMERGENCY:
TRANSPORTATION BRANCH MARINE SAFETY OFFICE, FORT EUSTIS, VA	EMERGENCY: NON-EMERGENCY:
SITE	
CONTRACTOR	EMERGENCY: ON SITE CELL: HOTEL: OFFICE:

Appendix J

SHIPCHECK LISTING and PRIMER, HEALTH AND SAFETY PLAN

This document shall be incorporated into shipcheck documentation. The appropriate block will be checked if the factor(s) are worthy of note; subject to action; points of work stoppage; or contribute significantly to the design of the FM-200 Total Flooding Fire Extinguishing System or the Water Washdown System. A checked block shall require that the formal Audit/Verification documentation applicable to the Specific Vessel contain directions, parameters, exclusions, or similar mention.

The following conditions or physical locations are to be noted and resolved prior to the performance of physical installation.

Environmental Factors:

- ☐ Ambient Temperature Below 50 Degrees Fahrenheit (50°F)
 - ☐ Ambient Temperature Above 90 Degrees Fahrenheit (90°F)
 - ☐ Liquid Pooled At Low Points
 - ☐ Unsheltered, Above Deck
 - ☐ Other _____
-

Health Factors

- ☐ Insect Infestation
 - ☐ Rodent Infestation
 - ☐ Toxic Atmosphere
 - ☐ Algae and/or Fungus
 - ☐ Flammable Atmosphere (Petroleum Or Alcohol Fumes Detected)
 - ☐ Asbestos Insulation
 - ☐ Asbestos Wiring
 - ☐ Excessive Dust And Particulate Matter
 - ☐ Other _____
-

Physical Conditions

- ☐ Poor Lighting (less than _____)
 - ☐ Limited access / Confined Space
 - ☐ Multiple Protrusions and Low Overhead
 - ☐ Immovable Operating Equipment
 - ☐ Seawater, Trash, and Fluid Waste in Bilge
 - ☐ Other _____
-

Material Subject to Relocation

- ☐ Paint (lacquer, enamel, alkyd, latex, epoxy modified, urethane modified)
 - ☐ Lubricants and Greases
 - ☐ Petroleum Based Fuels
 - ☐ Flammable Additives
 - ☐ Acids and Bases
 - ☐ Pesticides and Insecticides
 - ☐ Portable Equipment (electronic equipment, blowers and fans, pumps, etc.)
 - ☐ Personal Articles
 - ☐ Other _____
-

Alterations and Refit

- ☐ Temporary Access
 - ☐ Vents
 - ☐ Seal Repair/Replacement
 - ☐ Permanent Relocation of Existing Equipment
 - ☐ Other _____
-

Availability

- ☐ Power (onboard or shore), Capacity and Availability
 - ☐ Onboard Lifting Equipment (cranes, winches, etc.)
 - ☐ Auxiliary Fire and Salvage Pump(s)
 - ☐ Gangway and Boarding Provisions
 - ☐ Other _____
-

Communication

- ☐ Crew Briefing
 - ☐ Captain and Chief Engineer Meeting
 - ☐ Schedule
 - ☐ Requirements
 - ☐ Other _____
-

APPENDIX K

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM HEALTH AND SAFETY PLAN (HASP) COMPLIANCE AGREEMENT

**US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM
HEALTH AND SAFETY PLAN (HASP)
COMPLIANCE AGREEMENT**

I, _____ have received a copy of the Health and Safety Plan applicable to the Replacement Of Halon Total Flooding Fire Extinguishing Systems Onboard US Army Watercraft.

I have received information and training on the contents of the plan including operations to be performed, site hazards, safety requirements, use of personal protective clothing and equipment, monitoring requirements, site control and emergency procedures.

I have reviewed the plan, understand its requirements, and agree to comply with all of its provisions. I understand that failure to comply with these requirements could result in immediate disciplinary action, including dismissal.

Signature: _____

Position: _____

Employer: _____

Date: _____

APPENDIX L
TAILGATE SAFETY MEETING

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

TAILGATE SAFETY MEETING

CONDUCTED BY: _____ DATE: _____

SITE: _____ VESSEL: _____

TYPE OF WORK: _____

PPE REQUIREMENTS: _____ LEVEL OF PROTECTION: C D MOD. D

☐ FIRE WATCH

☐ CONFINED SPACE

HOSPITAL/CLINIC: _____

ADDRESS: _____

PHONE: _____

ATTENDEES

NAME (PRINTED)	SIGNATURE	POSITION

LIST PHYSICAL, CHEMICAL AND EQUIPMENT HAZARDS FOR TODAY'S WORK AND PREVENTIVE MEASURES TO BE TAKEN TO MINIMIZE THE HAZARD.

APPENDIX M

SAFETY INSPECTION REPORT

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

SAFETY INSPECTION REPORT

DATE: _____ TIME: _____
BY: _____ POSITION: _____
SITE: _____ VESSEL: _____
SPACE(S): _____

- ☐ SITE SURVEY
☐ SHIPCHECK
☐ DEMOLITION
☐ REFIT AND INSTALLATION
☐ INSPECTION / TEST

PERSONNEL ON-SITE: _____
SUBCONTRACTORS: _____

SAFETY CHECKLIST

- | | YES / No | | YES / No |
|--|---|---|---|
| 1. Is the HASP on-site and being followed?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> | 7. Is a first aid kit and fire extinguisher available and functional?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> |
| 2. Has a tailgate safety meeting been conducted?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> | 8. Are workers on-site properly trained?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> |
| 3. Are workers aware of site hazards?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> | 9. Is PPE inventory fully stocked?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> |
| 4. Is PPE being worn at all times?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> | 10. Is an eye wash station available/operating on-site?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> |
| 6. Are work zones established and well marked?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> | 11. Is site security being implemented properly?
If not, explain: _____ | <input type="checkbox"/> <input type="checkbox"/> |

SAFETY INSPECTION REPORT (CONT'D)

IDENTIFICATION OF NEW AND UNCONTROLLED HAZARDS: _____

Checklist Explanation(s) (Cont'd)

Item no: Explanation:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

APPENDIX N

HAZARD COMMUNICATION PROGRAM

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

HAZARD COMMUNICATION PROGRAM

INTRODUCTION

The purpose of the hazard communication program is to inform and train the contractor employees, and its' subcontractor(s) employees about the potential hazards of the materials that they may be exposed to while performing their duties. As a company we intend to provide information about chemical hazards and their control through labeling, chemical inventory, Material Safety Data Sheets (MSDS), and training programs as detailed in this written Hazard Communication Program. This program applies to all known hazardous substances in the workplace that employees may be exposed to under normal conditions of use or in a foreseeable emergency resulting from workplace operations. Emergencies include equipment failure, rupture of containers.

This program does not apply to:

1. Hazardous Waste (as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976).
2. Tobacco and tobacco products.
3. Wood and wood products.
4. Foods, drugs, or cosmetics intended for personal consumption by employees while in the work place.
5. Consumer products packaged for distribution to and use by, the general public, provided that employee exposure to the product is not significantly greater than the consumer exposure occurring during the principle consumer use of the product.

This program is in compliance with Title 8 of the California Code of Regulations (CCR), General Industry Safety Orders (GISO), Section 5194 titled Hazard Communication. This written program will be readily available at the contractor's and subcontractor's offices and operational installation sites.

HAZARD DETERMINATION

Manufacturers, distributors and importers of chemicals are required to assess the physical and health hazards associated with each chemical they manufacture or import. This information must be conveyed to the employer by means of Material Safety Data Sheets (MSDS) and container labels. Hazardous substances are any material listed in any one or more of the following lists:

1. The Director's List of Hazardous Substances (section 339 of CCR Title 8)
2. 29 CFR Part 1910, Subpart Z, Toxic & Hazardous Substances (OSHA)
3. Threshold Limit Values (American Conference of Gov. Industrial Hygienists) (ACGIH)
4. National Toxicology Program (NTP)
5. International Agency for research on Cancer (IARC)

6. Any scientific study providing evidence that a material has physical or health hazards.
7. Mixture containing 1% or more of a hazardous substance or
8. Mixtures containing 0.1% or more of a carcinogen.

Consumer products used under normal conditions are exempt from this regulation.

MATERIAL SAFETY DATA SHEETS (MSDS)

Manufacturers and importers of chemicals are required to develop an MSDS for each chemical based upon the information they obtained during the hazard determination process. A copy of the MSDS supplied by the manufacturer or distributor of the chemical, shall be kept at each Halon Replacement project site and offices. The Health & Safety Officer (HASO) IS responsible for obtaining an MSDS for all chemicals present at each site or office. These individuals shall review incoming MSDS for new and important health and safety information. All supervisors and employees will be informed of the new MSDS within 3 days of the Health & Safety Officer receiving the new MSDS from the manufacturer.

All MSDS will be reviewed for completeness by the HASO. If an MSDS is missing, a new MSDS shall be requested in writing from the manufacturer within 7 days. In the state of California, CA-OSHA will be notified in writing, if a complete MSDS has not been received from the manufacturer within 7 working days of requesting a copy of the MSDS.

The MSDS must contain the following information: chemical identity; chemical ingredients; physical and chemical characteristics; fire and explosion hazard data; reactivity hazard data; health hazard data; control and protective measures; precautions for safe handling and special hazards.

Upon receiving the MSDS from the first shipment of a chemical send the original to the Health & Safety Officer. The MSDS will be reviewed by the Health & Safety Officer and will be placed in the MSDS binder. The contractor and it's subcontractors will not accept chemicals from the manufacturer or distributor unless a copy of the MSDS has already been obtained from a previous shipment or the shipment is accompanied by an MSDS. MSDS are available to all employees and contractors in the work area for review during each work shift.

LABELING

The contractor and it's subcontractors will not accept or release hazardous chemicals for use unless the original container is clearly labeled with at least the following information: identity of the hazardous chemical(s); appropriate hazard warning statement; and name and address of the manufacturer. If the hazardous substance is transferred to a secondary container that container must be clearly labeled with at least the following information: identity of the hazardous chemical and the appropriate hazard warning statement.

All labels must be legible in English and prominently displayed on the container. Labels shall not be defaced or removed unless the container is immediately marked with the required information. Unlabeled chemical containers should be immediately reported to the area supervisor or the Health and Safety Officer. The name of the material that appears on the manufacturer's label shall be the same as the name that appears in the area chemical inventory as well as the MSDS. The regulation does not require labeling of the following substances: pesticides; distilled spirits (beverage alcohol's) for non-industrial use; and any consumer product.

EMPLOYEE TRAINING

Employees shall be trained on the hazardous substances in their work area: at the time of their initial assignment; whenever a new hazard is introduced into their area; and within 3 days of the employer receiving an updated MSDS containing new information indicating significant increased risk or changes in the use of personal protective equipment.

The contractor and its subcontractors employees assigned to the Halon Replacement Program will be trained in the following:

1. Overview of the Hazard Communication regulation including their rights.
2. Operations involving hazardous chemicals in their work area.
3. Location and availability of the MSDS and written hazard communication program.
4. How to read an MSDS and container labels.
5. Physical and health effects of hazardous chemicals and measures to be taken by the employee to protect themselves.
6. Emergency and first aid procedures to follow in case of exposure to hazardous chemicals.
7. Use of engineering controls, personal protective equipment and work practices to prevent or lessen exposure to hazardous chemicals.

EMPLOYEE RIGHTS

The employees shall be informed of their rights as follows:

1. That they personally receive information on the hazardous substances which they may be exposed to.
2. That their physician shall receive information regarding hazardous substances that they may be exposed to.
3. That no disciplinary action including discharge or discrimination will be taken against the employee due to the employee's exercise of the rights given to them under this regulation and written program.

CHEMICAL INVENTORY

Each Halon Replacement Program field office and project site containing hazardous chemicals must have a Chemical Inventory list. The inventory shall be placed with the MSDS binder in a conspicuous location. An MSDS shall be available for each chemical listed in the inventory. The Health & Safety Officer is responsible for updating the chemical inventory list whenever a new chemical is introduced into the area or a chemical is deleted from the area. Whenever a chemical is deleted from the area the MSDS will be placed in the archive for the area and retained for 30 years in compliance with CA OSHA GISO 3204. The HAST Manager will maintain copies of all MSDSs for materials received, encountered, or transported by the installation team.

APPENDIX O

ON-SITE *AUTHORIZED VISITOR INFORMATION FORM

US ARMY WATERCRAFT HALON REPLACEMENT PROGRAM

ON-SITE *AUTHORIZED VISITOR INFORMATION FORM

You are boarding a vessel and entering spaces where Demolition/Refit/Construction is being performed. Power equipment operation, welding and other inherently dangerous work is underway. You will remain with your designated escort at all times and follow his/her instructions for your safety and the safety of others. You must also wear all required protective clothing and equipment. Minimum protective equipment will be Level D protection (hard hat, steel toed boots, and safety glasses).

VISITORS CERTIFICATION

I acknowledge that I have been advised of the dangers present at this site/vessel/space. I agree to immediately follow all direction(s) given by my escort on site. I also certify that I do relieve the Contractor, it's subcontractor(s), the U.S. Government and Department of Defense, the state in which the project site is located, their officers, employees, and agents of all liability of all consequences raising from and related to the potential hazards associated with entry to this site.

NAME (PRINT)	SIGNATURE	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

* Note: As an "Authorized Visitor", you have been identified as having permission to board the vessel or have established right-to-board by associated and related tasking to that being performed during the Halon Replacement Program. Visitors with no prior authorization, are not crew replacements, are not members of the Installation Team, are not Government employees on business directly or indirectly related to the Halon Replacement Program, or cannot otherwise establish right-to-board, will be denied permission to board and may be delivered to security forces.

ATTACHMENT 4

LCU-2K-97-5553-TEST FUNCTIONAL TEST PLAN FOR REPLACEMENT OF HALON TOTAL FLOODING FIRE EXTINGUISHING SYSTEMS ON THE US ARMY LANDING CRAFT UTILITY, 2000 CLASS (LCU-2000)

MAY 2001

ISSUED BY:

**USDOT/RSPA
VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER
DTS-33
55 BROADWAY, KENDALL SQUARE
CAMBRIDGE, MA 02142**

**DISTRIBUTION STATEMENT A. APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.**

LCU-2K-97-5553-TEST
FUNCTIONAL TEST PLAN
FOR
REPLACEMENT OF HALON TOTAL FLOODING
FIRE EXTINGUISHING SYSTEMS
ON THE
US ARMY LANDING CRAFT UTILITY, 2000 CLASS (LCU-2000)

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1	GENERAL REQUIREMENTS.	1-1
2	VISUAL INSPECTION OF INSTALLATIONS AND MODIFICATIONS.	2-1
3	FUNCTIONAL TESTING OF FM-200 INSTALLATIONS.	3-1
4	FUNCTIONAL TESTING OF WATER WASHDOWN SYSTEM (WWS) INSTALLATIONS.	4-1
5	FUNCTIONAL TESTING OF VESSEL MODIFICATIONS.	5-1
6	TEST RESULTS.	6-1
7	FIRE PUMP FLOW TEST	7-1

1 GENERAL REQUIREMENTS.

1.1 Scope.

- 1.1.1 The completed FM-200 and Water Washdown System (WWS) installations and vessel modifications shall be inspected by Manufacturer's (Kidde-Fenwal) Certified Technical Representatives to verify compliance with the Volpe Center approved technical data, identified in Section 1.2. To confirm that the installations and modifications have been completed and function as specified, each system and modification will be inspected and tested in accordance with the requirements identified in Sections 2 through 5. The results of all inspections and tests will be recorded in Section 6. The results of LCU-2034 Fire Pump Flow Test, independently performed by the Volpe Center, is recorded in Section 7.

1.2 Technical Data.

1.2.1 FM-200 System.

Drawings:

LCU-2000-5553-1, titled: US Army LCU-2000 FM-200 System Piping Installation and Details.

LCU-2000-5553-3, titled: US Army LCU-2000 FM-200 System Electrical Modifications.

LCU-2000-5553-4, titled: US Army LCU-2000 FM-200 System Label Plates and Placards.

Specification:

LCU-2K-97-5553-SPEC, titled: Installation Specification for Replacement of Halon Total Flooding Fire Extinguishing Systems on the US Army Landing Craft Utility, 2000 Class (LCU-2000).

1.2.2 Water Washdown System.

Drawings:

LCU-2000-5231-1, titled: US Army LCU-2000 Water Washdown System Piping Installation and Details.

LCU-2000-5231-2, titled: US Army LCU-2000 Water Washdown System Label Plates and Placard.

Specification:

LCU-2K-97-5553-SPEC, titled: Installation Specification for Replacement of Halon Total Flooding Fire Extinguishing Systems on the US Army Landing Craft Utility, 2000 Class (LCU-2000).

1.2.3 Modifications:

Drawing:

LCU-2000-5553-2, titled:

US Army LCU-2000 FM-200 System Miscellaneous
Mods.

Specification:

LCU-2K-97-5553-SPEC, titled:

Installation Specification for Replacement of Halon Total
Flooding Fire Extinguishing Systems on the US Army,
Landing Craft Utility, 2000 Class (LCU-2000).

2 VISUAL INSPECTION OF INSTALLATIONS AND MODIFICATIONS.

2.1 FM-200 System Installations.

2.1.1 Perform a visual inspection of the Engine Room installation to verify installation in accordance with the Technical Data identified in Section 1.2.1. Record all results and discrepancies in Section 6.1.

2.1.2 Perform a visual inspection of the Bow Thruster Room installation to verify installation in accordance with the Technical Data identified in Section 1.2.1. Record all results and discrepancies in Section 6.2.

2.1.3 Perform a visual inspection of the Paint Locker installation to verify installation in accordance with the Technical Data identified in Section 1.2.1. Record all results and discrepancies in Section 6.3.

2.1.4 Perform a visual inspection of the A/C and Emergency Generator Room installation to verify installation in accordance with the Technical Data identified in Section 1.2.1. Record all results and discrepancies in Section 6.4.

2.1.5 Perform a visual inspection of the Tunnel installation to verify installation in accordance with the Technical Data identified in Section 1.2.1. Record all results and discrepancies in Section 6.5.

2.2 Water Washdown System (WWS) Installations.

2.2.1 Perform a visual inspection of the Engine Room WWS installation to verify installation in accordance with the Technical Data identified in Section 1.2.2. Record all results and discrepancies in Section 6.6.

2.2.2 Perform a visual inspection of the Bow Thruster Room WWS installation to verify installation in accordance with the Technical Data identified in Section 1.2.2. Record all results and discrepancies in Section 6.7.

2.2.3 Perform a visual inspection of the Tunnel WWS installation to verify installation in accordance with the Technical Data identified in Section 1.2.2. Record all results and discrepancies in Section 6.8.

2.3 Modifications.

2.3.1 Perform a visual inspection of Main Engine Room Door Seals to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.9.

2.3.2 Perform a visual inspection of the Paint Locker Natural Supply Louver to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.10.

2.3.3 Perform a visual inspection of the Paint Locker Powered Exhaust Louver to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.11.

2.3.4 Perform a visual inspection of the A/C and Emergency Generator Room Door Hold Down to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.12.

2.3.5 Perform a visual inspection of the Tunnel Vent Cover (Fwd Stbd Side) to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.13.

2.3.6 Perform a visual inspection of the Tunnel Vent Cover (Aft Port Side) to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.14.

2.3.7 Perform a visual inspection of the Tunnel Vent Watertight Closure (Aft Stbd Side) to verify modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.15.

2.3.8 Perform a visual inspection of the A/C and Emergency Generator Room Automatic Fire Damper modification was performed in accordance with the Technical Data identified in Section 1.2.3. Record all results and discrepancies in Section 6.16.

3 FUNCTIONAL TESTING OF FM-200 INSTALLATIONS.

3.1 Engine Room.

3.1.1 Prior to performing Functional Testing, system piping installation, including all welding, shall be complete. Prior to installation of discharge nozzles and connection to cylinders, system piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked using soapy water to locate leaks. Extreme caution shall be used while the system is charged. In lieu of pneumatic testing, small independent system piping installations protecting spaces such as Emergency Generator Rooms and Paint Lockers may be tested in accordance with 46 CFR 95.15-15(j)(4) (Blowing out the system piping with air at a pressure of at least 100 psi and check each joint for leaks with soapy water). Record test results in Section 6.16. Install discharge nozzles and connect piping to cylinders. **NOTE: The system piping testing may be performed prior to Functional Testing provided testing is witnessed by the Volpe Center Contracting Officer's Technical Representative (COTR) or designated representative and the vessel Chief Engineer or designated representative.**

3.1.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on all penetrations exposed to the weather and watertight pull boxes to verify penetrations and pull box installations are watertight. Record test results in Section 6.17.

WARNING: PRIOR TO PERFORMING THE TESTS IDENTIFIED IN SECTIONS 3.1.3, 3.1.4, AND 3.1.5, DISABLE EACH AGENT CYLINDER RELEASE MECHANISM SO THAT ACTIVATION OF THE RELEASE MECHANISM WILL NOT RELEASE AGENT. UPON COMPLETION OF TESTING, LEAVE SYSTEM READY FOR INTENDED SERVICE.

3.1.3 Operate each FM-200 pull box. Verify the force required to pull the pull handle does not exceed 40 pounds. Verify cable operated control on the CO₂ cylinder operates (pin extends). Record test results in Section 6.18.

3.1.4 Operate the Local Manual Release Lever on the CO₂ cylinder. Verify proper operation of Local Manual Release Lever (pin extends). Record test results in Section 6.19.

3.1.5 Operate the FM-200 Emergency Release Levers. Verify proper operation of Emergency Release Lever (pin extends). Record test results in Section 6.20.

3.1.6 Manually operate the pressure switch and verify the below listed machinery and ventilation systems secure automatically. Upon completion of testing, reset pressure switch, and record test results in Section 6.21.

- Engine Room Supply Fan, SF-1 Port.
- Engine Room Exhaust Fan, EF-1 Port.
- Ship's Service Diesel Generator No. 1, Starboard.
- Main Engine, Port.
- Fuel Oil Transfer Pump No. 1.
- Engine Room Supply Fan, SF-2 Stbd.
- Engine Room Exhaust Fan, EF-2 Stbd.
- Ship's Service Diesel Generator No. 2 Port.
- Main Engine, Starboard.
- Fuel Oil Transfer Pump No. 2.

3.1.7 With pressure switch manually operated, verify operation of the below listed items from the 120 v ships service. Upon completion of testing, reset pressure switch, and record test results in Section 6.22.

- Warning Bell.
- Warning Light (Amber Strobe) (Engine Room, Port).
- Warning Light (Amber Strobe) (Storeroom).
- Warning Light (Amber Strobe) (Engine Room, Starboard).
- Warning Light (Amber Strobe) (Machine Shop).
- Electric Horn/Strobes (Fwd and Aft of EOS).

3.1.8 With pressure switch manually operated, verify operation of the below listed items from the emergency generator. Upon completion of testing, reset pressure switch, and record test results in Section 6.23.

- Warning Bell.
- Warning Light (Amber Strobe) (Engine Room, Port).
- Warning Light (Amber Strobe) (Storeroom).
- Warning Light (Amber Strobe) (Engine Room, Starboard).
- Warning Light (Amber Strobe) (Machine Shop).
- Electric Horn/Strobes (Fwd and Aft of EOS).

3.1.9 With pressure switch manually operated, verify operation of the below listed items using only 24 v battery bank. Upon completion of testing, reset pressure switch, and record test results in Section 6.24. Requires securing breaker to effected battery charger (circuit EP113, Emergency Switchboard 120 v Distribution Panel, located in the A/C and Emergency Generator Room) prior to test. Upon completion of testing, reset breaker.

- Electric Horn/Strobes (Fwd. and Aft of EOS).

3.1.10 Disconnect CO₂ discharge hose from cylinder. Attach CO₂ test cylinder to CO₂ discharge hose. Activate CO₂ test cylinder and verify shutdown/operation of the below listed items. Measure time from automatic activation of pressure switch to ventilation shutdown (stops moving air) for each ventilation system. Measure time, from automatic activation of pressure switch to engine shutdown, for each diesel engine. Check piping joints for leaks (check each joint for leaks with soapy water). Confirm venting of CO₂ from system after operation of Time Delay. Upon completion of testing, reconnect CO₂ discharge hose to cylinder and record test results and time delay discharge time results in Section 6.25.

- Engine Room Supply Fan, SF-1 Port.
- Engine Room Supply Fan, SF-2 Stbd.
- Engine Room Exhaust Fan, EF-1 Port.
- Engine Room Exhaust Fan, EF-2 Stbd.

- Ship's Service Diesel Generator No. 1, Starboard.
- Main Engine, Port.
- Fuel Oil Transfer Pump No. 1.
- Warning Light (Amber Strobe) (Storeroom).
- Warning Light (Amber Strobe) (Engine Room, Port).
- Time Delay Operates for 60 sec (+/- 12 sec).
- Warning Bell.
- Ship's Service Diesel Generator No. 2 Port.
- Main Engine, Starboard.
- Fuel Oil Transfer Pump No. 2.
- Warning Light (Amber Strobe) (Engine Room, Starboard).
- Warning Light (Amber Strobe) (Machine Shop).
- Electric Horn/Strobes.

3.1.11 Perform a test of the Time Delay Override by charging the system with CO₂ and raising lever to verify proper operation of the Time Delay Override. Record test results in Section 6.26.

3.1.12 Perform a test of the below listed doors, escape scuttle, ventilation dampers, and ventilation covers for the Engine Room to verify proper operation and closure. Record results and discrepancies in Section 6.27.

- Engine Room Entrance Door
- Damper, Engine Room Supply Fan, SF-2 Starboard
- Tunnel Watertight Door
- Tunnel Supply Fan, SF-3 Cover
- EOS Escape Scuttle.
- Engine Room Escape Scuttle
- Damper, Engine Room Supply Fan, SF-1 Port
- Tunnel Vent Watertight Closure (Aft Stbd)
- Tunnel Vent Cover (Aft Port).
- Air Cond Unit Fire Damper No. 7.

3.2 Bow Thruster Room.

3.2.1 Prior to performing Functional Testing, system piping installation, including all welding, shall be complete. Prior to installation of discharge nozzles and connection to cylinders, system piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked using soapy water to locate leaks. Extreme caution shall be used while the system is charged. In lieu of pneumatic testing, small independent system piping installations protecting spaces such as Emergency Generator Rooms and Paint Lockers may be tested in accordance with 46 CFR 95.15-15(j)(4) (Blowing out the system piping with air at a pressure of at least 100 psi and check each joint for leaks with soapy water). Record test results in Section 6.28. Install discharge nozzles and connect piping to cylinders. **NOTE: The system piping testing may be performed prior to Functional Testing provided testing is witnessed by the Volpe Center Contracting Officer's Technical Representative (COTR) or designated representative and the vessel Chief Engineer or designated representative.**

3.2.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on all penetrations exposed to the weather and watertight pull boxes to verify penetrations and pull box installations are watertight. Record test results in Section 6.29.

WARNING: PRIOR TO PERFORMING THE TESTS IDENTIFIED IN SECTIONS 3.2.3, 3.2.4, AND 3.2.5, DISABLE EACH AGENT CYLINDER RELEASE MECHANISM SO THAT ACTIVATION OF THE RELEASE MECHANISM WILL NOT RELEASE AGENT. UPON COMPLETION OF TESTING, LEAVE SYSTEM READY FOR INTENDED SERVICE.

3.2.3 Operate each FM-200 pull box. Verify the force required to pull the pull handle does not exceed 40 pounds. Verify cable operated control on the CO₂ cylinder operates (pin extends). Record test results in Section 6.30.

3.2.4 Operate the Local Manual Release Lever on the CO₂ cylinder. Verify proper operation of Local Manual Release Lever (pin extends). Record test results in Section 6.31.

3.2.5 Manually operate the pressure switch and verify the below listed machinery and ventilation system secure automatically. Upon completion of testing, reset pressure switch, and record test results in Section 6.32.

- Powered Supply Ventilation to Bow Thruster Room.
- Bow Thruster Diesel Engine.

3.2.6 With pressure switch manually operated, verify operation of the below listed items from the 120 v ships service. Upon completion of testing, reset pressure switch, and record test results in Section 6.33.

- Warning Bell.
- Warning Light (Amber Strobe).
- Electric Horn/Strobe

3.2.7 With pressure switch manually operated, verify operation of the below listed items from the emergency generator. Upon completion of testing, reset pressure switch, and record test results in Section 6.34.

- Warning Bell.
- Warning Light (Amber Strobe).
- Electric Horn/Strobe

3.2.8 With pressure switch manually operated, verify operation of the below listed item using only the 24 v battery bank. Upon completion of testing, reset pressure switch, and record test results in Section 6.35. Requires securing breaker to effected battery charger (circuit EP113, Emergency Switchboard 120 v Distribution Panel, located in the A/C and Emergency Generator Room) prior to test. Upon completion of testing, reset breaker.

- Electric Horn/Strobe.

3.2.9 Disconnect CO₂ discharge hose from cylinder. Attach CO₂ test cylinder to CO₂ discharge hose. Activate CO₂ test cylinder and verify shutdown/operation of the below listed items. Measure time from automatic activation of pressure switch to ventilation shutdown (stops moving air) for each ventilation system.

Measure time, from automatic activation of pressure switch to engine shutdown, for each diesel engine. Check piping joints for leaks (check each joint for leaks with soapy water). Confirm venting of CO₂ from system after operation of Time Delay. Upon completion of testing, reconnect CO₂ discharge hose to cylinder and record test results and time delay discharge time results in Section 6.36.

- Bow Thruster Diesel Engine.
- Powered Supply Ventilation To Bow Thruster Room.
- Warning Alarm Bell.
- Warning Light (Amber Strobe).
- Time Delay Operates for 60 sec (+/- 12 sec).
- Electric Horn/Strobe.

3.2.10 Perform a test of the Time Delay Override by charging the system with CO₂ and raising lever to verify proper operation of the Time Delay Override. Record test results in Section 6.37.

3.2.11 Perform a test of the below listed door, escape scuttle, and ventilation covers for the Bow Thruster Room to verify proper operation and closure. Record results and discrepancies in Section 6.38.

- Bow Thruster Room Supply Fan Cover.
- Bow Thruster Room Watertight door.
- Tunnel Vent Cover (Fwd).
- Bow Thruster Room Natural Exhaust Cover.
- Bow Thruster Room Escape Scuttle.

3.3 Paint Locker.

3.3.1 Prior to performing Functional Testing, system piping installation, including all welding, shall be complete. Prior to installation of discharge nozzles and connection to cylinders, system piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked using soapy water to locate leaks. Extreme caution shall be used while the system is charged. In lieu of pneumatic testing, small independent system piping installations protecting spaces such as Emergency Generator Rooms and Paint Lockers may be tested in accordance with 46 CFR 95.15-15(j)(4) (Blowing out the system piping with air at a pressure of at least 100 psi and check each joint for leaks with soapy water). Record test results in Section 6.39. Install discharge nozzles and connect piping to cylinders. **NOTE: The system piping testing may be performed prior to Functional Testing provided testing is witnessed by the Volpe Center Contracting Officer's Technical Representative (COTR) or designated representative and the vessel Chief Engineer or designated representative.**

3.3.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on all penetrations exposed to the weather and watertight pull boxes to verify penetrations and pull box installations are watertight. Record test results in Section 6.40.

WARNING: PRIOR TO PERFORMING THE TEST IDENTIFIED IN SECTIONS 3.3.3, 3.3.4, AND 3.3.5, DISABLE EACH AGENT CYLINDER RELEASE MECHANISM SO THAT ACTIVATION OF THE RELEASE MECHANISM WILL NOT RELEASE AGENT. UPON COMPLETION OF TESTING, LEAVE SYSTEM READY FOR INTENDED SERVICE.

3.3.3 Operate FM-200 pull box. Verify the force required to pull the pull handle does not exceed 40 pounds. Verify cable operated control on the cylinder operates (pin extends). Record test results in Section 6.41.

3.3.4 Operate the Local Manual Release Lever on the FM-200 cylinder. Verify proper operation of Local Manual Release Lever (pin extends). Record test results in Section 6.42.

3.3.5 Manually operate the pressure switch and verify the below listed ventilation system secures automatically. Measure time from activation of pressure switch to shutdown (stops moving air) for ventilation system. Upon completion of testing, reset pressure switch and record test results in Section 6.43.

- Paint Locker Exhaust Fan.

3.3.6 With pressure switch manually operated, verify operation of the Warning Alarm Bell. Upon completion of testing, reset pressure switch and record test results in Section 6.44.

3.3.7 Disconnect piping from FM-200 cylinder. Attach CO₂ test cylinder to piping. Activate CO₂ test cylinder and verify operation of the below listed items. Upon completion of testing, reconnect FM-200 piping and leave system ready for intended service. Record test results in Section 6.45.

- Warning Bell.
- Paint Locker Siren.

3.3.8 Perform a test of the below listed door and ventilation covers for the Paint Locker to verify proper operation and closure. Record results and discrepancies in Section 6.46.

- Paint Locker Natural Supply Louver Cover.
- Paint Locker Powered Exhaust Louver Cover.
- Paint Locker Watertight Door.

3.4 A/C and Emergency Generator Room.

3.4.1 Prior to performing Functional Testing, system piping installation, including all welding, shall be complete. Prior to installation of discharge nozzles and connection to cylinders, system piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test

pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked using soapy water to locate leaks. Extreme caution shall be used while the system is charged. In lieu of pneumatic testing, small independent system piping installations protecting spaces such as Emergency Generator Rooms and Paint Lockers may be tested in accordance with 46 CFR 95.15-15(j)(4) (Blowing out the system piping with air at a pressure of at least 100 psi and check each joint for leaks with soapy water). Record test results in Section 6.47. Install discharge nozzles and connect piping to cylinders. **NOTE: The system piping testing may be performed prior to Functional Testing provided testing is witnessed by the Volpe Center Contracting Officer's Technical Representative (COTR) or designated representative and the vessel Chief Engineer or designated representative.**

3.4.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on all penetrations exposed to the weather and watertight pull boxes to verify penetrations and pull box installations are watertight. Record test results in Section 6.48.

WARNING: PRIOR TO PERFORMING THE TESTS IDENTIFIED IN SECTIONS 3.4.3, 3.4.4, AND 3.4.5, DISABLE EACH AGENT CYLINDER RELEASE MECHANISM SO THAT ACTIVATION OF THE RELEASE MECHANISM WILL NOT RELEASE AGENT. UPON COMPLETION OF TESTING, LEAVE SYSTEM READY FOR INTENDED SERVICE.

3.4.3 Operate FM-200 pull box. Verify the force required to pull the pull handle does not exceed 40 pounds. Verify cable operated control on the CO₂ cylinder operates (pin extends). Record test results in Section 6.49.

3.4.4 Operate the Local Manual Release Lever on the CO₂ cylinder. Verify proper operation of Local Manual Release Lever (pin extends). Record test results in Section 6.50.

3.4.5 Manually operate the pressure switch and verify the below listed machinery and ventilation systems secure automatically. Upon completion of testing, reset pressure switch, and record test results in Section 6.51.

- A/C and Emergency Generator Room Power Supply Ventilation.
- Emergency Generator Diesel Engine.

3.4.6 With pressure switch manually operated, verify operation of the below listed items from the 120 v ships service. Upon completion of testing, reset pressure switch, and record test results in Section 6.52.

- Warning Light (Amber Strobe).
- Warning Bell.
- Electric Horn/Strobe

3.4.7 With pressure switch manually operated, verify operation of the below listed item using only the 24 v battery bank. Upon completion of testing, reset pressure switch, and record test results in Section 6.53. Requires securing breaker to effected battery charger (circuit EP112, Emergency Switchboard 120 v Distribution Panel, located in the A/C and Emergency Generator Room) prior to test. Upon completion of testing, reset breaker.

- Electric Horn/Strobe.

3.4.8 Disconnect CO₂ discharge hose from cylinder. Attach CO₂ test cylinder to CO₂ discharge hose. Activate CO₂ test cylinder and verify shutdown/operation of the below listed items. Measure time from automatic activation of pressure switch to ventilation shutdown (stops moving air) for each ventilation system. Measure time, from automatic activation of pressure switch to engine shutdown, for each diesel engine. Check piping joints for leaks (check each joint for leaks with soapy water). Confirm venting of CO₂ from system after operation of Time Delay. Upon completion of testing, reconnect CO₂ discharge hose to cylinder and record test results and time delay discharge time results in Section 6.54.

- Warning Bell.
- Warning Light (Amber Strobe).
- Time Delay Operates for 60 sec (+/- 10 sec).
- Electric Horn/Strobe (powered by 110 V system).
- Automatic fire dampers (3)
- A/C and Emergency Generator Room Powered Supply Ventilation.
- Emergency Generator Diesel Engine.

3.4.9 Perform a test of the Time Delay Override by charging the system with CO₂ and raising lever to verify proper operation of the Time Delay Override. Record test results in Section 6.55.

3.4.10 Perform a test of the below listed doors and ventilation covers for the A/C and Emer Generator Room to verify proper operation and closure. Record results and discrepancies in Section 6.56.

- Emergency Generator Engine Air Exhaust Cover.
- A/C and Emergency Generator Room Natural Air Intake Cover.
- A/C and Emergency Generator Room Powered Supply Vent Cover.
- Manually trip automatic fire dampers (3)
- A/C and Emergency Generator Room Watertight Door.
- A/C and Emergency Generator Room Entrance Door.
- Air Conditioner Vent Plenum.

3.5 Tunnel.

3.5.1 Prior to performing Functional Testing, system piping installation, including all welding, shall be complete. Prior to installation of discharge nozzles and connection to cylinders, system piping shall be cleaned, blown out, and subjected to a pneumatic leak test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked using soapy water to locate leaks. Extreme caution shall be used while the system is charged. In lieu of pneumatic testing, small independent system piping installations protecting spaces such as Emergency Generator Rooms and Paint Lockers may be tested in accordance with 46 CFR 95.15-15(j)(4) (Blowing out the system piping with air at a pressure of at least 100 psi and check each joint for leaks with soapy water). Record test results in Section 6.57. Install discharge nozzles and connect piping to cylinders.

NOTE: The system piping testing may be performed prior to Functional Testing provided testing is witnessed by the Volpe Center Contracting Officer's Technical Representative (COTR) or designated representative and the vessel Chief Engineer or designated representative.

3.5.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on all penetrations exposed to the weather and watertight pull boxes to verify penetrations and pull box installations are watertight. Record test results in Section 6.58.

WARNING: PRIOR TO PERFORMING THE TESTS IDENTIFIED IN SECTIONS 3.5.3, 3.5.4, AND 3.5.5, DISABLE EACH AGENT CYLINDER RELEASE MECHANISM SO THAT ACTIVATION OF THE RELEASE MECHANISM WILL NOT RELEASE AGENT. UPON COMPLETION OF TESTING, LEAVE SYSTEM READY FOR INTENDED SERVICE.

3.5.3 Operate each FM-200 pull box. Verify the force required to pull the pull handle does not exceed 40 pounds. Verify cable operated control on the CO₂ cylinder operates (pin extends). Record test results in Section 6.59.

3.5.4 Operate the Local Manual Release Lever on the CO₂ cylinder. Verify proper operation of Local Manual Release Lever (pin extends). Record test results in Section 6.60.

3.5.5 Manually operate the pressure switch and verify the below listed ventilation system secures automatically. Upon completion of testing, reset pressure switch, and record test results in Section 6.61.

- Tunnel Supply Fan, SF-3.

3.5.6 With pressure switch manually operated, verify operation of the below listed items from the 120 v ships service. Upon completion of testing, reset pressure switch, and record test results in Section 6.62.

- Warning Light (Amber Strobe).
- Warning Bell.
- Electric Horn/Strobe

3.5.7 With pressure switch manually operated, verify operation of the below listed items from the emergency generator. Upon completion of testing, reset pressure switch, and record test results in Section 6.63.

- Warning Light (Amber Strobe).
- Warning Bell.
- Electric Horn/Strobe

3.5.8 With pressure switch manually operated, verify operation of the below listed item using only the 24 v battery bank. Upon completion of testing, reset pressure switch, and record test results in Section 6.64. Requires securing breaker to effected battery charger (circuit EP113, Emergency Switchboard 120 v Distribution Panel, located in the A/C and Emergency Generator Room) prior to test. Upon completion of testing, reset breaker.

- Electric Horn/Strobe.

3.5.9 Disconnect CO₂ discharge hose from cylinder. Attach CO₂ test cylinder to CO₂ discharge hose. Activate CO₂ test cylinder and verify shutdown/operation of the below listed items. Measure time from automatic activation of pressure switch to ventilation shutdown (stops moving air) for each ventilation system. Check piping joints for leaks (check each joint for leaks with soapy water). Confirm venting of CO₂ from system after operation of Time Delay. Upon completion of testing, reconnect CO₂ discharge hose to cylinder and record test results and time delay discharge time results in Section 6.65.

- Tunnel Supply Fan, SF-3.
- Electric Horn/Strobe (powered by 110 V system).
- Warning Bell.
- Time Delay Operates for 60 sec (+/- 12 sec).
- Warning Light (Amber Strobe).

3.5.10 Perform a test of the Time Delay Override by charging the system with CO₂ and raising lever to verify proper operation of the Time Delay Override. Record test results in Section 6.66.

3.5.11 Perform a test of the below listed doors, and ventilation closures for the Tunnel to verify proper operation and closure. Record results and discrepancies in Section 6.67.

- Tunnel Vent Watertight Closure (FWD).
- Tunnel Watertight Door.
- Tunnel Vent Watertight Closures (Aft P/S).
- Bow Thruster Room Watertight door.

4 FUNCTIONAL TESTING OF WATER WASHDOWN SYSTEM (WWS) INSTALLATIONS.

4.1 Engine Room.

4.1.1 Prior to performing Functional Testing, system piping installation, including all welding, shall be complete. Pneumatic testing or hydrostatic testing, as described below, may be performed.

Pneumatic Testing: Upon installation (including connection to fire main) and prior to installation of spray nozzles, system piping shall be cleaned, blown out, and subjected to a pneumatic test in accordance with 46 CFR 56.97-35 (excluding (f)) and NVIC 6-72, Change 1, Section D.3. The gas used as a test medium shall not be flammable (nitrogen or other inert gas). If CO₂ is used as the test medium, it shall be vaporized and at ambient conditions prior to and during testing. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked using soapy water to locate leaks only. Extreme caution shall be used while the system piping is charged. Record test results in Section 6.68. Install spray nozzles.

Hydrostatic Testing: Upon installation (including connection to fire main) and prior to installation of spray nozzles, system piping shall be cleaned, blown out, and subjected to a hydrostatic test in accordance with 46 CFR 56.97-30. Test medium shall be fresh water. Test pressure shall be 1.5 times the maximum system working pressure and shall be held for a minimum of 10 minutes. Following application of the test pressure for 10 minutes, an examination of all joints, connections, and regions of high stress shall be made. At the end of 10 minutes, the pressure drop shall not exceed five (5) percent of the test pressure. For systems where the five (5) percent pressure drop is exceeded, the piping shall be checked to locate all leaks. Extreme caution shall be used while the system piping is charged. Record test results in Section 6.69. Install spray nozzles. **NOTE: The system piping testing may be performed prior to Functional Testing providing testing is witnessed by the Volpe Center Contracting Officer's Technical Representative (COTR) or designated representative and the vessel Chief Engineer or designated representative.**

4.2 Bow Thruster Room.

See 4.1.1 above. Record in Section 6.70.

4.3 Tunnel.

See 4.1.1 above. Record in Section 6.71.

5 FUNCTIONAL TESTING OF VESSEL MODIFICATIONS.

5.1 Engine Room Door Seals.

5.1.1 Open and close Engine Room door. Verify that contact has been made between the door seal and door jamb. Verify that the door sweep is in contact with the Main Deck. Record test results in Section 6.72.

5.2 Paint Locker Natural Supply Louver.

5.2.1 Open and close louver cover. Verify adequate contact has been made between the louver cover and the knife-edge while hold-downs are applied. Record test results in Section 6.73.

5.2.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on the Paint Locker Natural Supply Louver Cover. Record test results in Section 6.74.

5.3 Paint Locker Powered Exhaust Louver.

5.3.1 Open and close louver cover. Verify adequate contact has been made between the louver cover and the knife-edge while hold-downs are applied. Record test results in Section 6.75.

5.3.2 Perform a hose test, using fresh water at a minimum pressure of 30 psi, on the Paint Locker Powered Exhaust Louver Cover. Record test results in Section 6.76.

5.4 A/C and Emergency Generator Room Door Hold Down.

5.4.1 Open A/C and Emergency Generator Room Door. Verify contact has been made between the door and the hold down and that door remains in open position with sufficient resistance. Close A/C and Emergency Generator Room Door. Verify hold down releases door by pulling door handle. Record test results in Section 6.77.

5.5 Tunnel Vent Covers (Fwd Stbd Side and Aft Port Side) Modification.

5.5.1 Open and close vent covers. Verify covers can be manually locked in closed position when hold down (in open position) has been released. Verify adequate contact has been made between the vent cover and the knife-edge. Record test results in Section 6.78.

5.6 Tunnel Vent Watertight Closure (Aft Stbd Side) Modification.

5.6.1 Open and Close vent watertight closure. Verify vent watertight closure opens and closes while turning vent wheel, and again using butterfly handle. Record test results in Section 6.79.

5.7 A/C and Emergency Generator Room Automatic Fire Dampers.

5.7.1 Verify automatic fire dampers close when released manually by the chains and automatically by the pressure trip devices. Ensure dampers slam closed.

6 TEST RESULTS FOR LCU - _____.

NOTE: ALL TESTING SHALL BE WITNESSED BY:

- **THE VOLPE CENTER CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR), OR DESIGNATED REPRESENTATIVE.**
- **THE VESSEL CHIEF ENGINEER, OR DESIGNATED REPRESENTATIVE.**

6.1 VISUAL INSPECTION OF ENGINE ROOM FM-200 SYSTEM INSTALLATION.

6.1.1 Data.

Reference: Test Plan Section 2.1.1.

Test Date: _____

Test Time: _____

6.1.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.1.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in the vessel specific as-built drawings.

6.1.3 Test Results:

-Installation in accordance with Test Criteria.

Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.2 VISUAL INSPECTION OF BOW THRUSTER ROOM FM-200 SYSTEM INSTALLATION.

6.2.1 Data.

Reference: Test Plan Section 2.1.2.

Test Date: _____

Test Time: _____

6.2.2 Test Criteria:

-Installation is in accordance with the Technical Data identified in Section 1.2.1.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in vessel specific as-built drawings.

6.2.3 Test Results:

-Installation in accordance with Test Criteria.

Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.3 VISUAL INSPECTION OF PAINT LOCKER FM-200 SYSTEM INSTALLATION.

6.3.1 Data.

Reference: Test Plan Section 2.1.3.

Test Date: _____

Test Time: _____

6.3.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.1.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in the vessel specific as-built drawings.

6.3.3 Test Results:

-Installation in accordance with Test Criteria.

Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.4 VISUAL INSPECTION OF A/C AND EMERGENCY GENERATOR ROOM FM-200 SYSTEM INSTALLATION.

6.4.1 Data.

Reference: Test Plan Section 2.1.4.

Test Date: _____

Test Time: _____

6.4.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.1.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in the vessel specific as-built drawings.

6.4.3 Test Results:

-Installation in accordance with Test Criteria.

Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.5 VISUAL INSPECTION OF TUNNEL FM-200 SYSTEM INSTALLATION.

6.5.1 Data.

Reference: Test Plan Section 2.1.5.

Test Date: _____

Test Time: _____

6.5.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.1.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in the vessel specific as-built drawings.

6.5.3 Test Results:

-Installation in accordance with Test Criteria.

Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.6 VISUAL INSPECTION OF THE ENGINE ROOM WATER WASHDOWN SYSTEM (WWS) INSTALLATION.

6.6.1 Data.

Reference: Test Plan Section 2.2.1.

Test Date: _____

Test Time: _____

6.6.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.2.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in vessel specific as-built drawings.

6.6.3 Test Results:

-Installation in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.7 VISUAL INSPECTION OF THE BOW THRUSTER ROOM WATER WASHDOWN SYSTEM (WWS) INSTALLATION.

6.7.1 Data.

Reference: Test Plan Section 2.2.2.

Test Date: _____

Test Time: _____

6.7.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.2.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in vessel specific as-built drawings.

6.7.3 Test Results:

-Installation in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.8 VISUAL INSPECTION OF TUNNEL WATER WASHDOWN SYSTEM (WWS) INSTALLATION.

6.8.1 Data.

Reference: Test Plan Section 2.2.3.

Test Date: _____

Test Time: _____

6.8.2 Test Criteria:

-Installation is in accordance with the Technical Data, Section 1.2.2.

-Note: Minor changes to allow for vessel specific design configuration is acceptable. Changes will be documented in vessel specific as-built drawings.

6.8.3 Test Results:

-Installation in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.9 VISUAL INSPECTION OF ENGINE ROOM DOOR SEALS MODIFICATION.

6.9.1 Data.

Reference: Test Plan Section 2.3.1.

Test Date: _____

Test Time: _____

6.9.2 Test Criteria:

-Modification performed in accordance with the Technical Data, Section 1.2.3.
(LCU-2K-97-5553-SPEC).

6.9.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Printed Name of Person Performing Visual Inspection: _____

Signature of Person Performing Visual Inspection: _____

6.10 VISUAL INSPECTION OF PAINT LOCKER NATURAL SUPPLY LOUVER COVER
MODIFICATION.

6.10.1 Data.

Reference: Test Plan Section 2.3.2.

Test Date: _____

Test Time: _____

6.10.2 Test Criteria:

-Modification performed in accordance with Technical Data, Section 1.2.3.
(LCU-2K-97-5553-SPEC).

6.10.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Recorded By: _____

Witnessed By: _____

Witnessed By: _____

6.11 VISUAL INSPECTION OF PAINT LOCKER POWERED EXHAUST LOUVER COVER
MODIFICATION.

6.11.1 Data.

Reference: Test Plan Section 2.3.3.

Test Date: _____

Test Time: _____

6.11.2 Test Criteria:

-Modification performed in accordance with Technical Data, Section 1.2.3. (LCU-2K-97-5553-SPEC).

6.11.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Recorded By: _____

Witnessed By: _____

Witnessed By: _____

6.12 VISUAL INSPECTION OF A/C AND EMERGENCY GENERATOR ROOM DOOR HOLD DOWN MODIFICATION.

6.12.1 Data.

Reference: Test Plan Section 2.3.4.

Test Date: _____

Test Time: _____

6.12.2 Test Criteria:

-Modification performed in accordance with Technical Data, Section 1.2.3. (LCU-2K-97-5553-SPEC).

6.12.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Recorded By: _____

Witnessed By: _____

Witnessed By: _____

6.13 VISUAL INSPECTION OF TUNNEL VENT COVER (FWD STBD SIDE) MODIFICATION.

6.13.1 Data.

Reference: Test Plan Section 2.3.5.

Test Date: _____

Test Time: _____

6.13.2 Test Criteria:

-Modification performed in accordance with Technical Data, Section 1.2.3. (LCU-2K-97-5553-SPEC).

6.13.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Recorded By: _____

Witnessed By: _____

Witnessed By: _____

6.14 VISUAL INSPECTION OF TUNNEL VENT COVER (AFT PORT SIDE) MODIFICATION.

6.14.1 Data.

Reference: Test Plan Section 2.3.6.

Test Date: _____

Test Time: _____

6.14.2 Test Criteria:

-Modification performed in accordance with Technical Data, Section 1.2.3. (LCU-2K-97-5553-SPEC).

6.14.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Recorded By: _____

Witnessed By: _____

Witnessed By: _____

6.15 VISUAL INSPECTION OF TUNNEL VENT WATERTIGHT CLOSURE (AFT STBD SIDE) MODIFICATION.

6.15.1 Data.

Reference: Test Plan Section 2.3.7.

Test Date: _____

Test Time: _____

6.15.2 Test Criteria:

-Modification performed in accordance with Technical Data, Section 1.2.3. (LCU-2K-97-5553-SPEC).

6.15.3 Test Results:

-Modification performed in accordance with Test Criteria.

Test Results: Accept _____

Reject _____

Discrepancies Noted:

Recorded By: _____

Witnessed By: _____

Witnessed By: _____

6.16 TESTING OF ENGINE ROOM FM-200 PIPING SYSTEM.

6.16.1 Data.

Reference: Test Plan Section 3.1.1.

Test Date: _____

Test Time: _____

Test Pressure: 540 PSI.

Hold Time: 10 Minutes.

6.16.2 Test Criteria:

- Piping system, after hold time of 10 minutes, maintains minimum pressure of 513 PSI.
- System is free of leaks.

6.16.3 Test Results:

- Piping system meets minimum pressure requirement after 10 minute hold time and is free of leaks.

Test Pressure After 10 Minute Hold Time: _____PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.17 HOSE TESTING OF EXTERNAL PENETRATIONS AND WATERTIGHT PULL BOXES FOR ENGINE ROOM.

6.17.1 Data.

Reference: Test Plan Section 3.1.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI.

6.17.2 Test Criteria:

- External penetration for FM-200 Warning Bell is free of leaks at Test Pressure.
- External penetration for FM-200 Watertight Pull Box is free of leaks at Test Pressure.

6.17.3 Test Results:

- External penetrations free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.18 FM-200 PULL BOXES FOR ENGINE ROOM.

6.18.1 Data.

Reference: Test Plan Section 3.1.3.

Test Date: _____

Test Time: _____

6.18.2 Test Criteria:

- Apply 40 lbs. to pull lever to ensure cable remains intact.
- pull lever should extend 3-4 inches.
- Control head pin extends to activate cylinder.

6.18.3 Test Results:

Interior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Exterior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.19 OPERATION OF LOCAL MANUAL RELEASE LEVERS FOR ENGINE ROOM.

6.19.1 Data.

Reference: Test Plan Section 3.1.4.

Test Date: _____

Test Time: _____

6.19.2 Test Criteria:

-Pin on Local Manual Release extends adequately to activate cylinder.

6.19.3 Test Results:

-Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.20 OPERATION OF EMERGENCY RELEASE LEVER FOR ENGINE ROOM.

6.20.1 Data.

Reference: Test Plan Section 3.1.5.

Test Date: _____

Test Time: _____

6.20.2 Test Criteria:

-Pin on Emergency Release extends adequately to activate system.

6.20.3 Test Results:

-Pin extends adequately to activate system.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.21 AUTOMATIC SHUTDOWN OF MACHINERY AND VENTILATION SYSTEMS BY PRESSURE SWITCH MANUAL ACTIVATION FOR ENGINE ROOM.

6.21.1 Data.

Reference: Test Plan Section 3.1.6.

Test Date: _____

Test Time: _____

6.21.2 Test Criteria:

-Upon manual activation of Pressure Switch, the following automatically shut down:

- | | |
|--|---|
| • Engine Room Supply Fan, SF-1 Port. | • Engine Room Supply Fan, SF-2 Starboard. |
| • Engine Room Exhaust Fan, EF-1 Port. | • Engine Room Exhaust Fan, EF-2 Starboard. |
| • Ship's Service Diesel Generator No. 2, Port. | • Ship's Service Diesel Generator No. 1, Starboard. |
| • Main Engine, Port. | • Main Engine, Starboard. |
| • FO Transfer Pump, No. 1. | • FO Transfer Pump, No. 2. |

6.21.3 Test Results:

-Machinery and Ventilation Systems, identified in Test Criteria, automatically shut down upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.22 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR ENGINE ROOM (USING 120 V SHIPS SERVICE).

6.22.1 Data.

Reference: Test Plan Section 3.1.7.

Test Date: _____

Test Time: _____

6.22.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning System is activated (powered by the 120 v ships service).

- Warning Bell.
- Warning Light (Amber Strobe) (Engine Room, Port).
- Warning Light (Amber Strobe) (Storeroom).
- Warning Light (Amber Strobe) (Engine Room, Starboard).
- Warning Light (Amber Strobe) (Machine Shop).
- Electric Horn/Strobes (Fwd and Aft bulkheads of EOS).

6.22.3 Test Results.

-Warning Systems identified in Test Criteria activate upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.23 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR ENGINE ROOM (POWERED BY EMERGENCY GENERATOR).

6.23.1 Data.

Reference: Test Plan Section 3.1.8.

Test Date: _____

Test Time: _____

6.23.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning Systems are activated (powered by Emergency Generator:

- Warning Bell.
- Warning Light (Amber Strobe) (Engine Room, Port).
- Warning Light (Amber Strobe) (Storeroom).
- Warning Light (Amber Strobe) (Engine Room, Starboard).
- Warning Light (Amber Strobe) (Machine Shop).
- Electric Horn/Strobes (Fwd and Aft bulkheads of EOS).

6.23.3 Test Results.

-Warning Systems identified in Test Criteria activate upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.24 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR ENGINE ROOM ELECTRIC HORN/STROBES (USING 24 V BATTERY BANK).

6.24.1 Data.

Reference: Test Plan Section 3.1.9.

Test Date: _____

Test Time: _____

6.24.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning System is activated (powered by the 24 v battery bank). Requires securing all power to the vessel prior to test. Note to ensure the gyro is offline and auto start of emergency generator is disengaged. Upon completion of testing restore shore power:

- Electric Horn/Strobes (Fwd and Aft of EOS).

6.24.3 Test Results.

-Warning Systems identified in Test Criteria activate upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.25 AUTOMATIC SHUTDOWN AND WARNING SYSTEM ACTIVATION BY CO₂ FOR ENGINE ROOM.

6.25.1 Data.

Reference: Test Plan Section 3.1.9.

Test Date: _____

Test Time: _____

6.25.2 Test Criteria:

-Upon activation by CO₂, the following items of machinery automatically shut down in less than 60 seconds:

- Ship's Service Diesel Generator No. 2, Port.
- Main Engine, Port.
- FO Transfer Pump, No. 1.
- Ship's Service Diesel Generator No. 1, Starboard.
- Main Engine, Starboard.
- FO Transfer Pump, No. 2.

-Upon activation by CO₂, the following ventilation systems automatically shut down in less than 60 seconds:

- Engine Room Supply Fan, SF-1 Port.
- Engine Room Exhaust Fan, EF-1 Port.
- Engine Room Supply Fan, SF-2 Starboard.
- Engine Room Exhaust Fan, EF-2 Starboard.

-Upon activation by CO₂, the following Warning Systems activate (Electric Horn/Strobe powered by 120 V system):

- Warning Bell.
- Warning Light (Amber Strobe) (Engine Room, Port).
- Warning Light (Amber Strobe) (Storeroom).
- Warning Light (Amber Strobe) (Engine Room, Starboard).
- Warning Light (Amber Strobe) (Machine Shop).
- Electric Horn/Strobe.

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂ after operation of Time Delay.

6.25.3 Test Results:

-Upon activation by CO₂, machinery shuts down automatically in times identified:

- Ship's Service Diesel Generator No. 2, Port. _____Seconds.
- Main Engine, Port. _____Seconds.
- FO Transfer Pump, No. 1. _____Seconds.
- Ship's Service Diesel Generator No. 1, Starboard. _____Seconds.
- Main Engine, Starboard. _____Seconds.
- FO Transfer Pump, No. 2. _____Seconds.

-Upon activation by CO₂, the following ventilation systems shut down in times identified:

- Engine Room Supply Fan, SF-1 Port. _____Seconds.
- Engine Room Exhaust Fan, EF-1 Port. _____Seconds.
- Engine Room Supply Fan, SF-2 Starboard. _____Seconds.
- Engine Room Exhaust Fan, EF-2 Starboard. _____Seconds.

-Upon activation by CO₂, the following Warning Systems activated in times identified:

- Warning Bell. _____
- Time Delay Operates for 60 sec (+/- 12 sec). _____Seconds Tested.
- Electric Horn/Strobe. _____
- Warning Light (Amber Strobe)
(Engine Room, Port). _____
- Warning Light (Amber Strobe)
(Storeroom). _____
- Warning Light (Amber Strobe)
(Engine Room, Starboard). _____
- Warning Light (Amber Strobe)
(Machine Shop). _____

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂
(After operation of Time Delay). _____
- Piping joints check for leaks
(Check each joint for leaks with soapy
water). _____

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.26 TESTING OF TIME DELAY OVERRIDE FOR ENGINE ROOM.

6.26.1 Data.

Reference: Test Plan Section 3.1.10.

Test Date: _____

Test Time: _____

6.26.2 Test Criteria:

-When Time Delay Override lever is raised, time delay is by-passed.

6.26.3 Test Results:

-Time Delay Override operates in accordance with Test Criteria.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.27 TESTING OF ENGINE ROOM VENTILATION DAMPERS AND SPACE CLOSURES.

6.27.1 Data.

Reference: Test Plan Section 3.1.11.

Test Date: _____

Test Time: _____

6.27.2 Test Criteria:

-Test the below listed dampers and space closures to verify proper operation and closure:

- Engine Room Entrance Door.
- Damper, Engine Room Supply Fan, SF-2 Starboard.
- Tunnel Watertight Door.
- Tunnel Supply Fan SF-3 Cover.
- EOS Escape Scuttle.
- Engine Room Escape Scuttle.
- Damper, Engine Room Supply Fan, SF-1 Port.
- Tunnel Vent Watertight Closure (Aft Stbd).
- Tunnel Vent Cover (Aft Port).
- Air Cond Unit Fire Damper NO. 7.

6.27.3 Test results:

-Record operation and closure of each damper and closure:

- | | | |
|---|-------------|-------------|
| • Engine Room Entrance Door. | _____ Pass. | _____ Fail. |
| • Tunnel Watertight Door. | _____ Pass. | _____ Fail. |
| • Tunnel Supply Fan SF-3 Cover. | _____ Pass. | _____ Fail. |
| • Engine Room Escape Scuttle. | _____ Pass. | _____ Fail. |
| • Damper, Engine Room Supply Fan, SF-2 Starboard. | _____ Pass. | _____ Fail. |
| • Damper, Engine Room Supply Fan, SF-1 Port. | _____ Pass. | _____ Fail. |
| • Tunnel Vent Cover (Aft Port). | _____ Pass. | _____ Fail. |
| • Tunnel Vent Watertight Closure (Aft Stbd). | _____ Pass. | _____ Fail. |
| • EOS Escape Scuttle. | _____ Pass. | _____ Fail. |
| • Air Cond Unit Fire Damper NO.7. | _____ Pass. | _____ Fail. |

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.28 TESTING OF BOW THRUSTER ROOM FM-200 PIPING SYSTEM.

6.28.1 Data.

Reference: Test Plan Section 3.2.1.

Test Date: _____

Test Time: _____

Test Pressure: 540 PSI.

Hold Time: 10 Minutes.

6.28.2 Test Criteria:

- Piping system, after Hold Time of 10 Minutes, maintains minimum pressure of 513 PSI.
- System is free of leaks.

6.28.3 Test Results:

- Piping system meets minimum pressure requirement after 10 minute hold time and is free of leaks.

Test Pressure After 10 Minute Hold Time: _____ PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.29 HOSE TESTING OF EXTERNAL PENETRATIONS AND WATERTIGHT PULL BOX FOR BOW THRUSTER ROOM.

6.29.1 Data.

Reference: Test Plan Section 3.2.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI.

6.29.2 Test Criteria:

- External penetration for FM-200 Warning Bell is free of leaks at Test Pressure.
- External penetration for FM-200 Watertight Pull Box is free of leaks at Test Pressure.

6.29.3 Test Results:

- External penetrations free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.30 FM-200 PULL BOXES FOR BOW THRUSTER ROOM.

6.30.1 Data.

Reference: Test Plan Section 3.2.3.

Test Date: _____

Test Time: _____

6.30.2 Test Criteria:

- Apply 40 lbs. to pull lever to ensure cable remains intact.
- pull lever should extend 3-4 inches.
- Control head pin extends to activate cylinder.

6.30.3 Test Results:

Interior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Exterior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.31 OPERATION OF LOCAL MANUAL RELEASE LEVER FOR BOW THRUSTER ROOM.

6.31.1 Data.

Reference: Test Plan Section 3.2.4.

Test Date: _____

Test Time: _____

6.31.2 Test Criteria:

-Pin on Local Manual Release extends adequately to activate cylinder.

6.31.3 Test Results:

Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.32 AUTOMATIC SHUTDOWN OF MACHINERY AND VENTILATION SYSTEMS BY PRESSURE SWITCH MANUAL ACTIVATION FOR BOW THRUSTER ROOM.

6.32.1 Data.

Reference: Test Plan Section 3.2.5.

Test Date: _____

Test Time: _____

6.32.2 Test Criteria:

-Upon manual activation of Pressure Switch, the following automatically shut down:

- Powered Supply Ventilation to Bow Thruster Room.
- Bow Thruster Diesel Engine.

6.32.3 Test Results:

-Machinery and Ventilation Systems, identified in Test Criteria, automatically shut down upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.33 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR BOW THRUSTER ROOM (USING 120 V SHIPS SERVICE).

6.33.1 Data.

Reference: Test Plan Section 3.2.6.

Test Date: _____

Test Time: _____

6.33.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning Systems are activated (powered by the 120 v ships service):

- Warning Bell.
- Electric Horn/Strobe.
- Warning Light (Amber Strobe).

6.33.3 Test Results.

-Warning Systems identified in Test Criteria activate upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.34 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR BOW THRUSTER ROOM (USING EMERGENCY GENERATOR).

6.34.1 Data.

Reference: Test Plan Section 3.2.7.

Test Date: _____

Test Time: _____

6.34.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning Systems are activated (powered by Emergency Generator):

- Warning Bell.
- Electric Horn/Strobe.
- Warning Light (Amber Strobe).

6.34.3 Test Results.

-Warning Systems identified in Test Criteria activate upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.35 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR BOW THRUSTER ROOM ELECTRIC HORN/STROBE (USING 24 V BATTERY BANK).

6.35.1 Data.

Reference: Test Plan Section 3.2.8.

Test Date: _____

Test Time: _____

6.35.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning System is activated (powered by the 24 v battery bank). Requires securing vessels power. Note to check gyro compass and emergency generator auto start is disengaged. Upon completion of testing restore power.

- Electric Horn/Strobe.

6.35.3 Test Results.

-Warning System identified in Test Criteria activate upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.36 AUTOMATIC SHUTDOWN AND WARNING SYSTEM ACTIVATION BY CO₂ FOR BOW THRUSTER ROOM.

6.36.1 Data.

Reference: Test Plan Section 3.2.9.

Test Date: _____

Test Time: _____

6.36.2 Test Criteria:

-Upon activation by CO₂, the following items of machinery automatically shut down in less than 60 seconds:

- Bow Thruster Diesel Engine.

-Upon activation by CO₂, the following ventilation system automatically shuts down in less than 60 seconds:

- Powered Supply Ventilation To Bow Thruster Room.

-Upon activation by CO₂, the following Warning Systems activate (Electric Horn/Strobe powered by 110 V system):

- Warning Bell.
- Time Delay Operates for 60 sec (+/- 12 sec).
- Warning Light (Amber Strobe).
- Electric Horn/Strobe (powered by 110 V system).

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂ after operation of Time Delay.

6.36.3 Test Results:

-Upon activation by CO₂, machinery shuts down automatically in times identified:

- Bow Thruster Engine. _____Seconds.

-Upon activation by CO₂, the following ventilation system shuts down in times identified:

- Powered Supply Ventilation To Bow Thruster Room. _____Seconds.

-Upon activation by CO₂, the following Warning Systems activated in times identified:

- Warning Bell. _____
- Warning Light (Amber Strobe). _____
- Time Delay Operates for 60 sec (+/- 10 sec). _____Seconds Tested.
- Electric Horn/Strobe. _____

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂ _____
(After operation of Time Delay).
- Piping joints check for leaks _____
(Check each joint for leaks with soapy water).

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.37 TESTING OF TIME DELAY OVERRIDE FOR BOW THRUSTER ROOM.

6.37.1 Data.

Reference: Test Plan Section 3.2.10.

Test Date: _____

Test Time: _____

6.37.1 Test Criteria:

-When Time Delay Override lever is raised, time delay is by-passed.

6.37.2 Test Results:

-Time Delay Override operates in accordance with Test Criteria.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.38 TESTING OF BOW THRUSTER ROOM VENTILATION DAMPERS AND SPACE CLOSURES.

6.38.1 Data.

Reference: Test Plan Section 3.2.11.

Test Date: _____

Test Time: _____

6.38.2 Test Criteria:

-Test the below listed door, ventilation covers, and escape scuttle to verify proper operation and closure:

- Bow Thruster Room Supply Fan Cover.
- Bow Thruster Room Natural Exhaust Cover.
- Bow Thruster Room Watertight Door.
- Bow Thruster Room Escape Scuttle.
- Tunnel Vent Cover (Fwd).

6.38.3 Test results:

-Record operation and closure of each door, ventilation covers, and escape scuttle:

- | | | |
|--|-------------|-------------|
| • Bow Thruster Room Supply Fan Cover. | _____ Pass. | _____ Fail. |
| • Bow Thruster Room Natural Exhaust Cover. | _____ Pass. | _____ Fail. |
| • Bow Thruster Room Watertight Door. | _____ Pass. | _____ Fail. |
| • Bow Thruster Room Escape Scuttle. | _____ Pass. | _____ Fail. |
| • Tunnel Vent Cover (Fwd). | _____ Pass. | _____ Fail. |

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.39 TESTING OF PAINT LOCKER FM-200 PIPING SYSTEM.

6.39.1 Data.

Reference: Test Plan Section 3.3.1.

Test Date: _____ Test Time: _____

6.39.2 Test Criteria:

-Perform testing of piping in accordance with 46 CFR 95.15-15(j)(4). (Blow out system piping with air at a pressure of at least 100 PSI).

6.39.3 Test Results:

-System piping blown out in accordance with CFR requirement identified in Test Criteria.

Air Pressure _____ PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.40 HOSE TESTING OF EXTERNAL PENETRATIONS AND WATERTIGHT PULL BOX FOR PAINT LOCKER.

6.40.1 Data.

Reference: Test Plan Section 3.3.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI.

6.40.2 Test Criteria:

- External penetration for FM-200 Warning Bell is free of leaks at Test Pressure.
- External penetration for FM-200 Watertight Pull Box is free of leaks at Test Pressure.

6.40.3 Test Results:

- External penetrations free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.41 PAINT LOCKER FM-200 PULL BOX.

6.41.1 Data.

Reference: Test Plan Section 3.3.3.

Test Date: _____

Test Time: _____

6.41.2 Test Criteria:

- Apply 40 lbs. to pull lever to ensure cable remains intact.
- pull lever should extend 3-4 inches.
- Control head pin extends to activate cylinder.

6.41.3 Test Results:

Exterior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.42 OPERATION OF PAINT LOCKER FM-200 LOCAL MANUAL RELEASE LEVER.

6.42.1 Data.

Reference: Test Plan Section 3.3.4.

Test Date: _____

Test Time: _____

6.42.2 Test Criteria:

-Pin on Local Manual Release extends adequately to activate cylinder.

6.42.3 Test Results:

-Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.43 AUTOMATIC SHUTDOWN OF VENTILATION SYSTEM BY PRESSURE SWITCH MANUAL ACTIVATION FOR PAINT LOCKER.

6.43.1 Data.

Reference: Test Plan Section 3.3.5.

Test Date: _____

Test Time: _____

6.43.2 Test Criteria:

-Upon manual activation of Pressure Switch, the following automatically shuts down:

- Paint Locker Exhaust Fan.

6.43.3 Test Results:

-Ventilation System, identified in Test Criteria, automatically shuts down upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.44 ACTIVATION OF PAINT LOCKER WARNING BELL BY MANUAL ACTIVATION OF PRESSURE SWITCH.

6.44.1 Data.

Reference: Test Plan Section 3.3.6.

Test Date: _____

Test Time: _____

6.44.2 Test Criteria:

-Upon manual activation of Pressure Switch, the following Warning System operates:

- Warning Bell.

6.44.3 Test Results:

-Warning Bell sounds upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.45 ACTIVATION OF PAINT LOCKER WARNING SYSTEMS BY CO₂ ACTIVATION.

6.45.1 Data.

Reference: Test Plan Section 3.3.7.

Test Date: _____

Test Time: _____

6.45.2 Test Criteria:

-Upon activation by CO₂, the following Warning Systems shall operate:

- Warning Bell.
- Paint Locker Siren.

6.45.3 Test Results:

-Upon activation by CO₂, the following Warning Systems operated:

- Warning Bell.
- Paint Locker Siren.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.46 TESTING OF PAINT LOCKER VENTILATION DAMPERS AND SPACE CLOSURES.

6.46.1 Data.

Reference: Test Plan Section 3.3.8.

Test Date: _____

Test Time: _____

6.46.2 Test Criteria:

-Test the below listed doors and covers to verify proper operation and closure:

- Paint Locker Natural Supply Louver Cover.
- Paint Locker Powered Exhaust Louver Cover.
- Paint Locker Watertight Door.

6.46.3 Test results:

-Record operation and closure of each door and cover:

- | | | |
|--|-------------|-------------|
| • Paint Locker Natural Supply Louver Cover. | _____ Pass. | _____ Fail. |
| • Paint Locker Powered Exhaust Louver Cover. | _____ Pass. | _____ Fail. |
| • Paint Locker Watertight Door. | _____ Pass. | _____ Fail. |

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.47 TESTING OF A/C AND EMERGENCY GENERATOR ROOM FM-200 PIPING SYSTEM.

6.47.1 Data.

Reference: Test Plan Section 3.4.1.

Test Date: _____

Test Time: _____

Test Pressure: 540 PSI.

Hold Time: 10 Minutes.

6.47.2 Test Criteria:

- Piping system, after Hold Time of 10 Minutes, maintains minimum pressure of 513 PSI.
- System is free of leaks.

6.47.3 Test Results:

- Piping system meets minimum pressure requirement after 10 minute hold time and is free of leaks.

Test Pressure After 10 Minute Hold Time: _____PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.48 HOSE TESTING OF EXTERNAL PENETRATIONS AND WATERTIGHT PULL BOX FOR A/C AND EMERGENCY GENERATOR ROOM.

6.48.1 Data.

Reference: Test Plan Section 3.4.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI

6.48.2 Test Criteria:

- External penetration for FM-200 Warning Bell is free of leaks at Test Pressure.
- External penetration for FM-200 Watertight Pull Box is free of leaks at Test Pressure.

6.48.3 Test Results:

- External penetrations free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.49 FM-200 PULL BOX FOR A/C AND EMERGENCY GENERATOR ROOM.

6.49.1 Data.

Reference: Test Plan Section 3.4.3.

Test Date: _____

Test Time: _____

6.49.2 Test Criteria:

- Apply 40 lbs. to pull lever to ensure cable remains intact.
- pull lever should extend 3-4 inches.
- Control head pin extends to activate cylinder.

6.49.3 Test Results:

Interior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.50 OPERATION OF LOCAL MANUAL RELEASE LEVER FOR A/C AND EMERGENCY GENERATOR ROOM.

6.50.1 Data.

Reference: Test Plan Section 3.4.4.

Test Date: _____

Test Time: _____

6.50.2 Test Criteria:

-Pin on Local Manual Release extends adequately to activate cylinder.

6.50.3 Test Results:

-Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.51 AUTOMATIC SHUTDOWN OF MACHINERY AND VENTILATION SYSTEMS BY PRESSURE SWITCH MANUAL ACTIVATION FOR A/C AND EMERGENCY GENERATOR ROOM.

6.51.1 Data.

Reference: Test Plan Section 3.4.5.

Test Date: _____

Test Time: _____

6.51.2 Test Criteria:

-Upon manual activation of Pressure Switch, the following automatically shut down:

- A/C and Emergency Generator Room
Powered Supply Ventilation.
- Emergency Generator Diesel Engine.

6.51.3 Test Results:

-Machinery and Ventilation System, identified in Test Criteria, automatically shut down upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.52 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR A/C AND EMERGENCY GENERATOR ROOM (USING 120 V SHIPS SERVICE).

6.52.1 Data.

Reference: Test Plan Section 3.4.6.

Test Date: _____

Test Time: _____

6.52.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning Systems are activated (powered by the 120 v ships service):

- Warning Bell.
- Electric Horn/Strobe.
- Warning Light (Amber Strobe).

6.52.3 Test Results.

-Warning Systems identified in Test Criteria activated upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.53 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR A/C AND EMERGENCY GENERATOR ROOM (USING 24 V BATTERY BANK).

6.53.1 Data.

Reference: Test Plan Section 3.4.7.

Test Date: _____

Test Time: _____

6.53.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning System is activated (powered by the 24 v battery bank). Requires securing vessels power. Note to check gyro compass and emergency generator auto start is disengaged. Upon completion of testing restore vessels power.

- Electric Horn/Strobe (powered by battery bank).

6.53.3 Test Results.

-Warning System identified in Test Criteria activated upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.54 AUTOMATIC SHUTDOWN AND WARNING SYSTEM ACTIVATION BY CO₂ FOR A/C AND EMERGENCY GENERATOR ROOM.

6.54.1 Data.

Reference: Test Plan Section 3.4.8.

Test Date: _____

Test Time: _____

6.54.2 Test Criteria:

-Upon activation by CO₂, the following items of machinery automatically shut down in less than 60 seconds:

- Emergency Generator Diesel Engine.

-Upon activation by CO₂, the following ventilation systems automatically shut down in less than 60 seconds:

- A/C and Emergency Generator Room Powered Supply Ventilation.
- Automatic Fire Dampers (3)

-Upon activation by CO₂, the following Warning Systems activate (Electric Horn/Strobe powered by 120 V system):

- Warning Bell.
- Warning Light (Amber Strobe).
- Time Delay Operates for 60 sec (+/- 10 sec).
- Electric Horn/Strobe (powered by 110 V system).

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂ after operation of Time Delay.

6.54.3 Test Results:

-Upon activation by CO₂, machinery shut down automatically in times identified:

- Emergency Generator Diesel Engine. _____Seconds.

-Upon activation by CO₂, the following ventilation systems shutdown in times identified:

- A/C and Emergency Generator Room _____Seconds.
Powered Supply Ventilation.

-Upon activation by CO₂, the following Warning System activated:

- Warning Bell. _____
- Warning Light (Amber Strobe). _____
- Time Delay Operates for 60 sec (+/- 12 sec). _____ Seconds Tested.
- Electric Horn/Strobe. _____

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂
(After operation of Time Delay). _____
- Piping joints check for leaks
(Check each joint for leaks with soapy
water). _____

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.55 TESTING OF TIME DELAY OVERRIDE FOR A/C AND EMERGENCY GENERATOR ROOM.

6.55.1 Data.

Reference: Test Plan Section 3.4.9.

Test Date: _____

Test Time: _____

6.55.2 Test Criteria:

-When Time Delay Override lever is raised, time delay is by-passed.

6.55.3 Test Results:

-Time Delay Override operates in accordance with Test Criteria.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.56 TESTING OF A/C AND EMERGENCY GENERATOR ROOM VENTILATION DAMPERS AND SPACE CLOSURES.

6.56.1 Data.

Reference: Test Plan Section 3.4.10.

Test Date: _____

Test Time: _____

6.56.2 Test Criteria:

-Test the below listed doors and covers to verify proper operation and closure:

- Emergency Generator Engine Exhaust Cover.
- A/C and Emergency Generator Room Entrance Door.
- A/C and Emergency Generator Room Natural Air Intake Cover.
- Automatic fire dampers
- A/C and Emergency Generator Room Watertight Door.
- Air conditioner Vent Plenum.
- A/C and Emergency Generator Room Powered Supply Vent Cover.

6.56.3 Test results:

-Record operation and closure of each doors and covers:

- | | | |
|---|-------------|-------------|
| • Emergency Generator Engine Exhaust Cover. | _____ Pass. | _____ Fail. |
| • A/C and Emergency Generator Room Entrance Door. | _____ Pass. | _____ Fail. |
| • A/C and Emergency Generator Room Natural Air Intake Cover. | _____ Pass. | _____ Fail. |
| • A/C and Emergency Generator Room Watertight Door. | _____ Pass. | _____ Fail. |
| • Air conditioner Vent Plenum. | _____ Pass. | _____ Fail. |
| • A/C and Emergency Generator Room Powered Supply Vent Cover. | _____ Pass. | _____ Fail. |
| • Automatic fire dampers | _____ Pass. | _____ Fail. |

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.57 TESTING OF TUNNEL FM-200 PIPING SYSTEM.

6.57.1 Data.

Reference: Test Plan Section 3.5.1.

Test Date: _____

Test Time: _____

Test Pressure: 540 PSI.

Hold Time: 10 Minutes.

6.57.2 Test Criteria:

- Piping system, after hold time of 10 minutes, maintains minimum pressure of 513 PSI.
- System is free of leaks.

6.57.3 Test Results:

- Piping system meets minimum pressure requirement after 10 minute hold time and is free of leaks.

Test Pressure After 10 Minute Hold Time: _____PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.56 HOSE TESTING OF EXTERNAL PENETRATIONS AND WATERTIGHT PULL BOXES FOR TUNNEL.

6.56.1 Data.

Reference: Test Plan Section 3.5.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI.

6.56.2 Test Criteria:

- External penetration for FM-200 Warning Bell is free of leaks at Test Pressure.
- External penetration for FM-200 Watertight Pull Box is free of leaks at Test Pressure.

6.56.3 Test Results:

- External penetrations free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.59 FM-200 PULL BOXES FOR TUNNEL.

6.59.1 Data.

Reference: Test Plan Section 3.5.3.

Test Date: _____

Test Time: _____

6.59.2 Test Criteria:

- Apply 40 lbs. to pull lever to ensure cable remains intact.
- pull lever should extend 3-4 inches.
- Control head pin extends to activate cylinder.

6.59.3 Test Results:

Interior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Exterior Pull Box:

- Applied 40 lbs. force.
- pull lever extends.
- Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.60 OPERATION OF LOCAL MANUAL RELEASE LEVER FOR TUNNEL.

6.60.1 Data.

Reference: Test Plan Section 3.5.4.

Test Date: _____

Test Time: _____

6.60.2 Test Criteria:

-Pin on Local Manual Release extends adequately to activate cylinder.

6.60.3 Test Results:

-Pin extends adequately to activate cylinder.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.61 AUTOMATIC SHUTDOWN OF VENTILATION SYSTEM BY PRESSURE SWITCH MANUAL ACTIVATION FOR TUNNEL.

6.61.1 Data.

Reference: Test Plan Section 3.5.5.

Test Date: _____

Test Time: _____

6.61.2 Test Criteria:

-Upon manual activation of Pressure Switch, the following automatically shuts down:

- Tunnel Supply Fan, SF-3.

6.61.3 Test Results:

-Ventilation System, identified in Test Criteria, automatically shuts down upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.62 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR TUNNEL (USING 120 V SHIPS SERVICE).

6.62.1 Data.

Reference: Test Plan Section 3.5.6.

Test Date: _____

Test Time: _____

6.62.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning Systems are activated (powered by the 120 v ships service):

- Warning Bell.
- Electric Horn/Strobe
- Warning Light (Amber Strobe).

6.62.3 Test Results.

-Warning Systems identified in Test Criteria activated upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.63 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR TUNNEL (USING EMERGENCY GENERATOR).

6.63.1 Data.

Reference: Test Plan Section 3.5.7.

Test Date: _____

Test Time: _____

6.63.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning Systems are activated (powered by Emergency Generator):

- Warning Bell.
- Electric Horn/Strobe
- Warning Light (Amber Strobe).

6.63.3 Test Results.

-Warning Systems identified in Test Criteria activated upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.64 WARNING SYSTEM ACTIVATION BY PRESSURE SWITCH MANUAL ACTIVATION FOR TUNNEL ELECTRIC HORN/STROBE (USING 24 V BATTERY BANK).

6.64.1 Data.

Reference: Test Plan Section 3.5.8.

Test Date: _____

Test Time: _____

6.64.2 Test Criteria:

-Upon manual activation of Pressure Switch, the Following Warning System is activated (Electric Horn/Strobe powered by battery bank). Requires securing vessels power. Note to check gyro compass and emergency diesel auto start is disengaged prior to test. Upon completion of testing restore vessels power.

- Electric Horn/Strobe.

6.64.3 Test Results.

-Warning Systems identified in Test Criteria activated upon manual activation of Pressure Switch.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.65 AUTOMATIC SHUTDOWN AND WARNING SYSTEM ACTIVATION BY CO₂ FOR TUNNEL.

6.65.1 Data.

Reference: Test Plan Section 3.5.9.

Test Date: _____

Test Time: _____

6.65.2 Test Criteria:

-Upon activation by CO₂, the following ventilation system automatically shuts down in less than 60 seconds:

- Tunnel Supply Fan, SF-3.

-Upon activation by CO₂, the following Warning Systems activate (Electric Horn/Strobe powered by 120 V system):

- Warning Bell.
- Time Delay Operates for 60 sec (+/- 12 sec).
- Warning Light (Amber Strobe).
- Electric Horn/Strobe.

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂ after operation of Time Delay.

6.65.3 Test Results:

-Upon activation by CO₂, the following ventilation system shuts down in times identified:

- Tunnel Supply Fan, SF-3. _____Seconds.

-Upon activation by CO₂, the following Warning System activated:

- Warning Bell. _____
- Time Delay Operates for 60 sec (+/- 12 sec). _____Seconds Tested.
- Electric Horn/Strobe. _____
- Warning Light (Amber Strobe). _____

-Upon activation by CO₂, piping is a closed system until after Time Delay operates, allowing CO₂ to vent outside.

- Confirm venting of CO₂ _____
(After operation of Time Delay).
- Piping joints check for leaks _____
(Check each joint for leaks with soapy water).

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.66 TESTING OF TIME DELAY OVERRIDE FOR TUNNEL.

6.66.1 Data.

Reference: Test Plan Section 3.5.9.

Test Date: _____

Test Time: _____

6.66.2 Test Criteria:

-When Time Delay Override lever is raised, time delay is overridden.

6.66.3 Test Results:

-Time Delay Override operates in accordance with Test Criteria.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.67 TESTING OF TUNNEL VENTILATION DAMPERS AND SPACE CLOSURES.

6.67.1 Data.

Reference: Test Plan Section 3.5.10.

Test Date: _____

Test Time: _____

6.67.2 Test Criteria:

-Test the below listed dampers and space closures to verify proper operation and closure:

- Tunnel Vent Watertight Closure (Fwd).
- Tunnel Watertight Door.
- Tunnel Vent Watertight Closure (Aft Stbd).
- Tunnel Vent Watertight Closure (Aft Port).
- Bow Thruster Room Watertight Door.

6.67.3 Test results:

-Record operation and closure of each damper and closure:

- | | | |
|--|-------------|-------------|
| • Tunnel Vent Watertight Closure (Fwd). | _____ Pass. | _____ Fail. |
| • Tunnel Watertight Door. | _____ Pass. | _____ Fail. |
| • Tunnel Vent Watertight Closure (Aft Port). | _____ Pass. | _____ Fail. |
| • Tunnel Vent Watertight Closure (Aft Stbd). | _____ Pass. | _____ Fail. |
| • Bow Thruster Room Watertight Door. | _____ Pass. | _____ Fail. |

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.68 TESTING OF ENGINE ROOM WATER WASHDOWN SYSTEM (WWS) PIPING SYSTEM.

6.68.1 Data.

Reference: Test Plan Section 4.1.1.

Test Date: _____

Test Time: _____

6.68.2 Test Criteria:

-Perform Pneumatic or Hydrostatic Test of WWS Piping System in accordance with Testing Requirements identified Technical Data, Section 1.2.2.

Test Pressure: 188 PSI.

Hold Time: 10 Minutes.

Minimum Test Pressure at end of 10 Minute Hold Time: 178 PSI.

6.68.3 Test Results.

Test Pressure: _____PSI.

Hold Time: ____Minutes.

Test Pressure After 10 Minute Hold Time: _____PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.69 TESTING OF BOW THRUSTER ROOM WATER WASHDOWN SYSTEM (WWS) PIPING SYSTEM.

6.69.1 Data.

Reference: Test Plan Section 4.2.1.

Test Date: _____

Test Time: _____

6.69.2 Test Criteria:

-Perform Pneumatic or Hydrostatic Test of WWS Piping System in accordance with Testing Requirements identified Technical Data, Section 1.2.2.

Test Pressure: 188 PSI.

Hold Time: 10 Minutes.

Minimum Test Pressure at end of 10 Minute Hold Time: 178 PSI.

6.69.3 Test Results.

Test Pressure: _____PSI.

Hold Time: ____Minutes.

Test Pressure After 10 Minute Hold Time: _____PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.70 TESTING OF TUNNEL WATER WASHDOWN SYSTEM (WWS) PIPING.

6.70.1 Data.

Reference: Test Plan Section 4.3.1.

Test Date: _____

Test Time: _____

6.70.2 Test Criteria:

-Perform Pneumatic or Hydrostatic Test of WWS Piping System in accordance with Testing Requirements identified Technical Data, Section 1.2.2.

Test Pressure: 188 PSI.

Hold Time: 10 Minutes.

Minimum Test Pressure at end of 10 Minute Hold Time: 178 PSI.

6.70.3 Test Results.

Test Pressure: _____PSI.

Hold Time: ____Minutes.

Test Pressure After 10 Minute Hold Time: _____PSI.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.71 ENGINE ROOM DOOR SEAL MODIFICATION.

6.71.1 Data.

Reference: Test Plan Section 5.1.1.

Test Date: _____

Test Time: _____

6.71.2 Test Criteria:

- With door fully closed, contact made between door seal and door jamb.
- With door fully closed, sweep make contact with door sill.

6.71.3 Test Results.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Discrepancies Noted:

6-72 PAINT LOCKER NATURAL SUPPLY LOUVER COVER MODIFICATION.

6.72.1 Data

Reference: Test Plan Section 5.2.1.

Test Date: _____

Test Time: _____

6.72.2 Test Criteria:

- Open and close louver.
- Adequate contact made between louver cover and knife-edge while hold-downs are applied.

6.72.3 Test Results.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Discrepancies Noted:

Witnessed By: _____

6.73 HOSE TESTING OF PAINT LOCKER NATURAL SUPPLY LOUVER COVER MODIFICATIONS.

6.73.1 Data.

Reference: Test Plan Section 5.2.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI.

6.73.2 Test Criteria:

- Paint Locker Natural Supply Louver Cover modification is free of leaks at Test Pressure.

6.73.3 Test Results:

- Louver modification is free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.74 PAINT LOCKER POWERED EXHAUST LOUVER COVER MODIFICATION.

6.74.1 Data

Reference: Test Plan Section 5.3.1.

Test Date: _____

Test Time: _____

6.74.2 Test Criteria:

- Open and close louver.
- Adequate contact made between louver cover and knife-edge while hold-downs are applied.

6.74.3 Test Results.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Discrepancies Noted:

6.75 HOSE TESTING OF PAINT LOCKER POWERED EXHAUST LOUVER COVER MODIFICATION.

6.75.1 Data.

Reference: Test Plan Section 5.3.2.

Test Date: _____

Test Time: _____

Test Pressure: 30 PSI.

6.75.2 Test Criteria:

- Paint Locker Powered Exhaust Louver Cover modification is free of leaks at Test Pressure.

6.75.3 Test Results:

- Louver Cover modification is free of leaks.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

6.76 A/C AND EMERGENCY GENERATOR ROOM DOOR HOLD DOWN MODIFICATION.

6.76.1 Data

Reference: Test Plan Section 5.4.1.

Test Date: _____

Test Time: _____

6.76.2 Test Criteria:

- Open door.
- Adequate contact made between door and hold down.
- Door remains in open position with sufficient resistance.
- Hold down releases door by pulling door handle.

6.76.3 Test Results.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Discrepancies Noted:

6.77 TUNNEL VENT COVER (FWD STBD SIDE AND AFT PORT SIDE) MODIFICATION.

6.77.1 Data

Reference: Test Plan Section 5.5.1.

Test Date: _____

Test Time: _____

6.77.2 Test Criteria:

- Open and close covers.
- Verify covers can be manually locked in closed position.
- Adequate contact made between cover and knife-edge.

6.77.3 Test Results.

Fwd Tunnel vent cover.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Aft Port side Tunnel vent cover.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Discrepancies Noted:

6.78 TUNNEL VENT WATERTIGHT CLOSURE (AFT STBD SIDE) MODIFICATION.

6.78.1 Data

Reference: Test Plan Section 5.6.1.

Test Date: _____

Test Time: _____

6.78.2 Test Criteria:

- Open and close vent watertight closure.
- Verify closure opens and closes while turning wheel and again using butterfly handle.

6.78.3 Test Results.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Discrepancies Noted:

6.79 A/C AND EMERGENCY GENERATOR ROOM AUTOMATIC FIRE DAMPERS – VISUAL AND FUNCTIONAL INSPECTION.

6.79.1 Data

Reference: Test Plan Section 5.7.1.

Test Date: _____

Test Time: _____

6.79.2 Test Criteria:

- Manually trip each fire damper (Qty of 3). Inspect for smooth, quick closing operation.
- Damper blades fully open and close.
- Ensure diesel exhaust damper is rated for heavy duty application and additional spring mechanism is installed.
- Ensure powered ventilation duct is wrapped in insulation.
- Ensure tested for automatic operation by CO2 gas release (see 6.54)
- Reset dampers.
- Operate each manual vent cover (exterior of vessel) to ensure properly aligned and tight fitting. Ensure ½” stainless steel studs installed and flat head machine screws, per drawing.

6.79.3 Test Results.

Passed: _____

Failed: _____

Performed By: _____

Witnessed By: _____

Witnessed By: _____

Discrepancies Noted:

**LANDING CRAFT UTILITY (LCU-____)
MAIN ENGINE ROOM WATER WASHDOWN SYSTEM**

FIRE PUMP FLOW TESTS

Prepared for

**U.S. Army Tank-Automotive and Armaments Command (TACOM)
Transportation Systems Management Office**

Prepared by



**U.S. Department of Transportation
John A. Volpe National Transportation Systems Center
Environmental Engineering Division
Cambridge, MA 02142**

***Dated* _____**

LCU-20____ FIRE PUMP FLOW TEST
performed date _____

1.0 Objectives

To validate that adequate pressure and flow of seawater is available to the Water Washdown Systems (WWS) connections through testing of the fire main pressure and flow. Use closest hose station downstream of each WWS connection to perform tests. Also, to validate that sufficient fire main capacity exists for 3, 1 ½ " hoses at full stream, in addition to the WWS supply requirement for the engine room system (worst case demand).

2.0 Definitions

Emergency fire pump - is the fire pump located outside the space protected, fed from the emergency generator or an independently driven diesel - no reliance on power source from within the protected space. In this case the Bow Thruster Fire Pump feeds the main engine space and the main engine room fire pump feeds the pipe tunnel and bow thruster space systems.

3.0 Fire Pump/Water Washdown System Specifications

LCU-2000:

Bow Thruster Emergency Diesel Fire Pump - 500 gpm at 125 psi.

Engine Room Motor Driven Fire Pumps (qty. 2) - 250 gpm (ea) at 125 psi.

Water Washdown System flow requirements:

80 psi and 5.6 gpm at each nozzle.

Engine room supply - 154 gpm and 109 psi at the WWS connection.

WWS connection - 6'6" above deck inside engine room door at frame 41 (4" line). Remaining flow to support three (3) 1 ½ " hose streams (95gpm @ 110 psi ea.)

Pipe Tunnel - 58 gpm and 92 psi at the WWS connection.

WWS connection - existing 4" fire main cross over in pipe tunnel overhead at frame 24. Remaining flow to support four (4) hose streams (95 gpm ea. @110 psi ea.).

Bow Thruster Space - 34 gpm and 88 psi at the WWS connection.

WWS connection - 6'5" above deck in pipe tunnel at frame 17. Remaining flow to support four (4) 1 ½ " hose streams (95 gpm @ 110 psi ea.).

4.0 Equipment/Personnel for Testing

- 1 ½ ” LINE GAGE
- 2 ½ ” LINE GAGE
- PITOT TUBE
- 7/8” SMOOTH BORE NOZZLE w/ 1 ½ ” NST
- 1 1/8” SMOOTH BORE NOZZLE W/ 2 ½ ” NST
- (2) 2 way radios
- 7 PARTICIPANTS (1 TO START/STOP PUMP, 5 AT NOZZLES, 1 TO TEST/RECORD DATA).

Participants:

<i>Name</i>	<i>Organization</i>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____

TABLE 1
DISCHARGE FROM SMOOTH BORE NOZZLES USING PITOT TUBE

Pitot Tube Nozzle Pressure	7/8" Smooth Bore Nozzle (gpm) 1 1/2" Hose Line	1 1/8" Smooth Bore Nozzle (gpm) 2 1/2" Hose Line
5	50	
7	59	
18	95	
36	135	224
38	138	231
40	142	237
50	159	265
58		280
60	174	290
70	188	313
80	201	335
90	213	355
100	225	374
110	236	392
120	246	410

5.0 Procedures

5.1 Conditions

Condition 1: (MAIN ENGINE ROOM WWS) To verify that there is adequate pressure and flow at the Engine Room Water Washdown System connection using the Bow Thruster fire pump and the fire main system aligned in the normal at-sea condition (the bridge fire monitors/foam eductors aligned, overboard discharge closed).

Condition 2: (MAIN ENGINE ROOM WWS) If necessary, to verify that there is adequate pressure and flow at the Engine Room Water Washdown System connection using the Bow Thruster fire pump and the fire main system aligned with the bridge fire monitors/foam eductors by-passed (overboard discharge closed).

Condition 3: (MAIN ENGINE ROOM WWS) To verify that with measured flow and pressure to the WWS connection, there is sufficient remaining flow (285 gpm) of sea water to support three (3) 1 ½ " hoses at full stream.

Condition 4: (BOW THRUSTER SPACE WWS) To verify that there is adequate pressure and flow at the Bow Thruster Space Water Washdown System connection using the engine room fire pump and the fire main system aligned in the normal at-sea condition (the bridge fire monitors/foam eductors aligned, overboard discharge closed).

5.2 Set-up, Requires Crew assistance of 6

1. Ensure all fire hose stations and any auxiliary systems (i.e. – foam monitors) connected to the fire main system are aligned in the normal at-sea condition. *Note – ensure the fire main system overboard discharge valve is closed.*
2. Locate the nearest downstream fire hose station from where the WWS connection is made. Record location and Fire Station No.
3. Install the line gage (1 ½ " or 2 ½ ", as appropriate) at this hose station, tighten with spanner wrench.
4. Uncoil the fire hose to a position out on deck to flow water overboard. Install smooth bore nozzle. Have crewmen hold the hose securely, directing water flow overboard. Ensure nozzle is properly manned (2 crew members for 1 ½ " and 3 crew members for 2 ½ " hose line) at all times during charging operations, and 1 crewman to start/stop the fire pump.

5.3 Static (no flow) Pressure Readings

1. Start the Bow Thruster Room fire pump diesel engine. Provide for sufficient engine warm up time. Engage fire pump.
2. Open the hose station valve, charging the hose on deck, remove any air by momentarily opening the nozzle operated by crewmen. Momentarily shut off nozzle to take readings.
3. Take pressure readings at the discharge side of the fire pump and at the hydrant line gage with fire main charged and no water flowing from the nozzle - Static Pressure Readings. Record.

5.4 Residual (flowing) Pressure Readings

1. Open nozzle (ensure line gage does not drop below 60 psi) to prevent pump runout, record pressure readings at the fire pump discharge and at the line gage. Record these residual pressure readings.
2. Using pitot tube, measure flow reading at the smooth bore nozzle outlet flowing water overboard. Take 3 readings moving pitot tube into 3 different orientations. Open air purge momentarily on pitot tube each time to bleed any air. Record pressure reading. Convert pitot tube velocity flow to gpm using Table 1 above.
4. If inadequate flow is determined, repeat procedures for condition 2 (bridge fire monitors bypassed).

6.0 Recorded Readings

Date of Testing – _____

6.1 Condition 1

Using Bow Thruster fire pump feeding fire main system, and foam eductor system valves and bridge fire monitors aligned. Bow Thruster engine running approximately 1800-2000 rpm.

SPACE TESTED

Main Engine Room

STATIC PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi
2. AT HOSE STATION NO. 2 _____ psi
LOCATION - Engine Room aft, port side

RESIDUAL PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi
2. AT HOSE STATION NO. 2 _____ psi
3. AT HOSE NOZZLE _____ psi pitot tube
4. WWS REQUIREMENT **154 gpm @ 109 psi**
7/8" smooth bore nozzle @ 48 psi = 156 gpm

Signatures:

Test performed by: _____

Test witnessed by: _____

Results: Condition 1 -

6.2 Condition 2 (If necessary)

Using bow thruster fire pump feeding fire main system (main engine room WWS station) and bridge foam eductor system by-passed.

SPACE TESTED

Main Engine Room

STATIC PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi
2. AT HOSE STATION NO. 2 _____ psi
LOCATION - Engine Room aft, port side

RESIDUAL PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi
2. AT HOSE STATION NO. 2 _____ psi
3. AT HOSE NOZZLE _____ psi pitot tube
154 gpm @ 109 psi req.
7/8" smooth bore nozzle @ 48 psi pitot = 156gpm gpm

Signatures:

Test performed by: _____

Test witnessed by: _____

Results: Condition 2 –

6.3 Condition 3

Using Bow Thruster fire pump feeding fire main system, and foam eductor system valves and bridge fire monitor aligned. Operating the 1 ½" Hose Station Number 2 and in addition Operating 2 ½" Fire Station Number 1.

Note: With the WWS operating, there should be seawater flow available for 3 - 1 ½" full streams (285 gpm).

SPACE TESTED

Main Engine Room

STATIC PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi
2. AT FOAM STATION NUMBER 1 _____ psi
3. AT HOSE STATION NUMBER 2 _____ psi

RESIDUAL PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi
2. AT HOSE STATION NUMBER 2 _____ psi
3. AT HOSE STATION NUMBER 2 NOZZLE _____ **psi pitot tube**
154 gpm @ 109 psi req.

7/8" smooth bore nozzle @ 48 psi = 156 gpm

4. AT FOAM STATION NUMBER 1 _____ psi
5. AT FOAM STATION NUMBER 1
NOZZLE _____ **psi pitot tube**
285 gpm @ 110 psi req.

1 1/8" smooth bore nozzle @ 58 psi pitot = 285 gpm

**TOTAL FLOW REQUIRED; WWS = 154 GPM, 3-1 ½" HOSES = 285 GPM = 439 GPM
TOTAL REQUIRED. TOTAL FLOW MEASURED; 142 GPM + 318 GPM = 460 GPM
TOTAL MEASURED.**

Signatures:

Test performed by: _____

Test witnessed by: _____

Results: Condition 3 –

6.4 Condition 4

Using main engine room electric fire pump feeding fire main system, and foam eductor system valves and bridge fire monitors aligned. Test Bow Thruster WWS feed using closest fire hose station (no.8).

SPACE TESTED

Bow Thruster Room

STATIC PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi

2. AT HOSE STATION NO. 8 _____ psi
LOCATION - Fwd. Tunnel - midship

RESIDUAL PRESSURE

1. AT FIRE PUMP DISCHARGE _____ psi

2. AT HOSE STATION NO. 8 _____ psi

3. AT HOSE NOZZLE _____ **psi pitot tube**

4. WWS REQUIREMENT **34 gpm @ 88 psi**
7/8" smooth bore nozzle @ 5 psi = 50 gpm

Signatures:

Test performed by: _____

Test witnessed by: _____

Results: Condition 1 -

7.0 Friction Loss Evaluation:

Provide sketches of fire main piping from riser to hose station number 2 to evaluate friction loss through the riser.

Friction Loss Evaluation:

The pressure reading at hose station no. 2 was 98 psi. It was necessary to evaluate the friction losses through the following components to calculate pressure available on the 01 deck at the actual WWS connection.

<u>Components</u>	<u>Equivalent lengths of pipe (ft)</u>
1. 1 1/2" gate valve	1.1 ft.
2. 1 1/2" steel piping – approx. 11'	11.0 ft.
3. 1 1/2" 90° elbows (2)	8.0 ft.
4. 1 1/2" 45° elbow	2.0 ft.
5. 2 1/2" x 2 1/2" x 1 1/2" T connection	12.3 ft.
6. 2 1/2" steel piping – approx. 17'	17.0 ft.
7. 2 1/2" 90° elbows (3) 6.2'x3=	18.6ft.

1 1/2" Line: Calculated friction losses through the following components: a 1 1/2" gate valve is equivalent to 1.1' of 1 1/2" pipe, plus 11' of steel pipe, plus 2-90° elbows (8'), plus a 45° elbow (2') = 22.1' total equivalent length. Head loss in steel pipe = 180' head loss per 100' of pipe flowing 175 gpm. $[22.1/100 \times 180 = 40 \text{ ft head loss}/2.3(\text{conv. factor}) = 17.3 \text{ psi loss}]$.

2 1/2" Line: Calculated friction losses through the following components: a 2 1/2" T (12.3'), plus 17' of 2 1/2" piping, plus (3) 90° elbows (18.6') = 47.9 total equivalent length. Head loss in 2 1/2" steel pipe = 21' head loss per 100' of pipe flowing 175 gpm. $[47.9/100 \times 21 = 10.05 \text{ ft head loss}/2.3(\text{conv. factor}) = 4.3 \text{ psi}]$.

Total pressure loss; 17.3 psi + 4.3 psi = 21.6 psi due to friction losses added to 98 psi measured at hose station number 2 = 119.6 psi calculated flow available at the WWS connection.

ATTACHMENT 5

PAST PERFORMANCE EVALUATION FORM

VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER PAST PERFORMANCE EVALUATION		
CONTRACTOR PERFORMANCE REPORT		
<input type="checkbox"/> Final <input type="checkbox"/> Interim – Period Report From: _____ To: _____		
1. Contractor Name and Address: (Identify Division)	2. Contract /Task Number: 3. Contract Value: \$ _____ (Base Plus Options) 4. Contract Award Date: _____ 5. Contract Completion Date: _____	
6. Type of Contract: (Check all that apply) - <input type="checkbox"/> FP <input type="checkbox"/> FPI <input type="checkbox"/> FP-EPA <input type="checkbox"/> CPFF Completion <input type="checkbox"/> CPFF - Term <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> ID/IQ <input type="checkbox"/> BOA <input type="checkbox"/> Requirements <input type="checkbox"/> Labor-Hour <input type="checkbox"/> T&M <input type="checkbox"/> SBSA <input type="checkbox"/> 8(a) <input type="checkbox"/> SBIR <input type="checkbox"/> Sealed Bid <input type="checkbox"/> Negotiated <input type="checkbox"/> Competitive <input type="checkbox"/> Non-Competitive		
7. Description of Requirement:		
8. Initial Ratings: (See Block 15 for Final Rating) Summarize contractor performance and circle in the column on the right of the number which corresponds to the performance rating for each rating category. Attach additional comments as necessary.		
a. Quality of Product/Service	Comments:	0 1 2 3 4
b. Cost Control	Comments:	0 1 2 3 4
c. Timeliness	Comments:	0 1 2 3 4
d. Business Relations	Comments:	0 1 2 3 4
e. Overall Satisfaction Rating	Comments	0 1 2 3 4
SOURCE SELECTION INFORMATION - SEE FAR 3.104		

CONTRACTOR PERFORMANCE REPORT INSTRUCTIONS

The Acquisition Division is responsible for the coordination and collection of Contractor Performance Reports. The Contracting Officer (CO) or Administrative Contracting Officer (ACO) will determine whether the report will be completed on a contractor task basis, and will coordinate completion of the attached report form with either the Contracting Officer's Technical Representative (COTR) or Technical Monitor delegated day-to-day responsibility for administration of the identified contractor or task order. This individual should consult with the CO/ACO where necessary to arrive at a consensus on the ratings to be awarded.

Section 42.1503 of the FAR requires that copies of these forms will be provided to the contractor, which must have an opportunity to respond and add comments to agency evaluations as described below. The Acquisition Division will perform this coordination function. Furthermore, the FAR requires that past performance evaluations be marked and treated as Source Selection Information and release of this information is prohibited except to Government personnel and the contractor whose performance is being evaluated. For these reasons, all outside inquiries concerning contractor past performance should be directed to the ACO, who will have access to the completed forms. Also, completed forms should be returned to the attention of the ACO/CO in a sealed envelope marked "Source Selection Sensitive"

COMPLETING THE FORM

Blocks 1 through 11 will be completed by the COTR or Technical Monitor, as applicable. Contact the ACO/CO if you require assistance or data in order to complete any of these blocks, especially blocks 1 through 6.

The Acquisition Division will be responsible for forwarding the completed form to the contractor for review and execution of blocks 12 and 13. The Acquisition Division will ensure blocks 14 through 16 are completed prior to filing in a secured location.

To Be Completed by COTR/Technical Monitor

Top of Form:	Indicate whether the report is a final or interim (annual) report, and give dates for the period of time being covered. Prior to the ending date of the contract, all reports should be marked "Interim".
Block 1:	Identify the name and address of the prime contractor.
Block 2:	Identify contract number of the contract being evaluated. If evaluation is being conducted for a specific task, include the task number.
Block 3:	Contract value or task value, as applicable. Include all options whether or not exercised to date.
Block 4:	Identify date that contract was awarded or task issued.
Block 5:	Identify completion date for contract or task as applicable.
Block 6:	All items that apply to the contractor task should be checked.
Block 7:	Provide a clear and concise description of the work being done under the contract or task and the current level of funding. Attach additional sheet(s), if needed, to ensure the description is adequate for future source selection officials to determine relevance.

SOURCE SELECTION INFORMATION – SEE FAR 3.104

9. Key Personnel: (Fill in as appropriate)				
Name/Title: _____		Period of Performance: _____		
Comments: _____				
Name/Title: _____		Period of Performance: _____		
Comments: _____				
Name/Title: _____		Period of Performance: _____		
Comments: _____				
Name/Title: _____		Period of Performance: _____		
Comments: _____				
10. Would you recommend this firm for award? Please explain. _____				
11.COTR/Program Manager/Tech Monitor Name (Printed): _____		Signature _____		
Phone/FAX/Internet Address: _____		Date: _____		
12. Contractor's Review: Were comments, rebuttals, or additional information provided: <input type="checkbox"/> No <input type="checkbox"/> Yes Please attach comments: Number of pages: _____				
13. Reviewer's Name (Printed): _____		Signature: _____		
Phone/FAX/Internet Address: _____		Date: _____		
14. Agency Review: Were contractor comments reviewed at a level above the Contracting Officer? <input type="checkbox"/> No <input type="checkbox"/> Yes Please attach comments. Number of pages: _____				
15. Final Ratings. Re-assess the Block 8 ratings based on contractor comments and agency review. Revise block 8 ratings, if appropriate.				
Quality _____	Cost Control _____	Timeliness _____	Business Relations _____	Customer Satisfaction _____
16. Contracting Officer's Name (Printed): _____		Signature _____		
Phone/FAX/Internet Address: _____		Date: _____		

SOURCE SELECTION INFORMATION – SEE FAR 3.104

Block 8 RATING DEFINITIONS

0 – Unsatisfactory - Performance failed to satisfy the minimum contract or task requirements, technical or otherwise. Areas of deficiency could include, but are not limited to: failure to meet schedules; failure to adequately estimate or control costs; inadequate staffing; lack of cooperation and responsiveness.

1 – Minimally Acceptable – Performance generally met minimum contract or task requirements, but significant issues arose which required expenditure of time or resources by the Government to ensure the requirements were met. Areas of re-work could include: late or incomplete deliverables; poor quality of work; lack of communication; cost control problems; contract administration problems.

2 – Satisfactory – Met all technical and administrative contract or task requirements. Minor issues arose which were resolved with minimal expenditure of time or resources.

3 – Good – Met all contract or task requirements and exceeded minimal requirements in some areas. No problems with quality, timeliness, or cost issues. Management was responsive.

4 – Exceptional – Performance significantly exceeded minimal technical requirements and met all other contract requirements. Areas in which performance was exceptional could include: early deliveries; creative approach; innovative technology; effective and proactive management and administration; commitment to customer satisfaction.

Block 8 – COMMENT ELEMENTS BY CATEGORY

(a) **Quality of product/service**

- (1) Compliance with contract or task requirements;
- (2) Accuracy of reports;
- (3) Appropriateness of contractor personnel assigned to the contract or task; and
- (4) Technical excellence of delivered supplies or services.

(b) **Cost Control**

- (1) Current, accurate, and complete billings;
- (2) The relationship of negotiated cost to actuals;
- (3) Cost containment initiatives; and
- (4) The number and cause of change orders issued.

(c) **Timeliness of Performance**

- (1) Whether the contractor met interim milestones;
- (2) Contractor's responsiveness to technical direction;
- (3) Contractor's responsiveness to contract change orders and administrative requirements;
- (4) Whether the contract/task was completed on time, including wrap-up and contract administration.

(d) Business Relations

- (1) Whether the contractor effectively managed the contract/task effort;**
- (2) How responsive the contractor was to contract requirements;**
- (3) How promptly the contractor notified the Government of problems;**
- (4) Whether the contractor was reasonable and cooperative;**
- (5) How flexible the contractor was;**
- (6) Whether the contractor was proactive;**
- (7) The effectiveness of contractor-recommended solutions; and**
- (8) Whether the contractor effectively implemented socioeconomic programs.**

Block 8: Circle the rating in the far right column that best describes the contractor's overall performance for each category. Comments and/or examples in sufficient detail to support the ratings must be provided. Attach additional comment sheets if needed. Definitions for each rating and a description of elements to consider when commenting on each category can be found at the end of these instructions.

Block 9: Identify the individual(s) primarily responsible for performance of the contract/task, not necessarily the persons identified as "Key Personnel" in the contractual document. Indicate how long each individual worked on the contract/task. If there were many individuals involved or many changes in these managers, a second page may be necessary. On the comments line, describe the key person's performance, attaching additional sheets when necessary.

Block 10: Explain why, given a choice, you would or would not recommend the contractor for an award to perform a similar contract or task.

Block 11: The COTR or Technical Monitor delegated responsibility for the day to day administration of the contract or task should sign this block, after consulting with the CO/ACO, where appropriate.

To be Completed by Contractor

Block 12: Block 12 must be completed to indicate that the contractor has been given the opportunity to review the evaluation.

The contractor will be provided with a copy of the completed evaluation form (including initial ratings) and attachments. The contractor has the right to submit to the CO comments, rebutting statements, or additional information which specifically addresses elements of the review. This response must be structured to clearly identify the specific category being addressed. This response must be delivered to the CO no later than 30 days after the mailing date on the evaluation form. In the event no response is received, the contractor will be deemed to have accepted the evaluation form as written.

Block 13: The contractor should sign this block to indicate that it has had an opportunity to review and comment on the ratings.

To be completed by the CO/ACO

Block 14: If the contractor accepts the ratings, they will be entered as Final Ratings in Block 15, no Agency Review is required, and the Contracting Officer's signature in Block 16 completes the process.

If the contractor objects to the initial ratings, a review will be undertaken by the CO, in consultation with the technical staff. If the CO does not concur in a modification, the matter will be reviewed at a level above the CO within the Acquisition Division, and a Final Rating determined by the Reviewing Official's Report, which will be attached to the Performance Report.

Block 15: If the initial ratings have been modified by either the CO or after Agency Review, insert the revised Final Ratings. If there has been no change to the initial ratings, insert the initial ratings.

Block 16: If agreement is reached on the ratings without an Agency Review, the CO will sign. If an Agency Review is carried out, the block must be signed by the Reviewing Official.

Attachment 6, Client Authorization Letter

[Company Name]
[Street Address]
[City, State/Province/Zip/Postal
Code]
[Date]

[Recipient Name]
[Address]
[City, State/Province Zip/Postal Code]

Dear [Client]:

We are currently responding to the Volpe Center Solicitation No. DTRS57-01-R-20021, for the procurement of Retrofit Installation of Fire Extinguishing systems Aboard LCU2000 Watercraft. The Volpe Center is placing increased emphasis in their acquisitions on past performance as a source selection evaluation factor. The Volpe Center requires Offerors to inform references identified in proposals that the Volpe Center may contact them about contract performance information.

If you are contacted by the Volpe Center for information on work we have performed under contract for your company/agency/state or local Government, you are hereby authorized to respond to Volpe Center inquiries.

Your cooperation is appreciated. Please direct any questions to

(Offeror's point of contact)

Sincerely,
[Your name]
[Your position]

[Typist's initials]
Enclosure: [Number]

cc: [Name]